THE UNIVERSITY
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The value of green space to people with a late onset visual impairment:

A study of people with Age-related Macular Degeneration (AMD)
in Scotland, United Kingdom

Azlina Aziz

Doctor of Philosophy
The University of Edinburgh
2016

Declaration

I hereby declare that I am the sole author of this thesis; that the following thesis is entirely my own work; and that no part of this thesis has been submitted for another degree or qualification.

Azlina Aziz
2016

Abstract

Having a sight impairment should not limit one's opportunity to be socially included and obtain the many benefits of being in a green space. It is a challenge for landscape architects to ensure that every green space is sensibly planned and designed to provide benefits to all users, including the visually impaired. However, to date, little research has explored the extent to which this group of people use their local green space and how the attributes of green space help to maintain or increase their sense of emotional well-being, especially when their vision loss occurs later in life. This study has drawn on a sample of visually impaired people with central vision loss caused by late onset Age-related Macular Degeneration (AMD) from across Scotland to address this research gap. Subjects ranged from being partially sighted to severely sight impaired or blind. It employed a mixed method research strategy with a quantitative method as the main approach, supplemented by qualitative methods and triangulation.

The study began with focus group discussions aimed at identifying those green space attributes that this group of people deemed important, as a basis for developing a choice-based conjoint (CBC) questionnaire survey. The survey data were analysed using conjoint analysis software (Sawtooth Software version 8.3) with a Hierarchical Bayesian (HB) method to evaluate the relative importance of green space attributes to the study participants. The purpose of this method was to demonstrate the different priorities placed by people with visual impairment on the physical, social, sensory and accessibility attributes of the green space. This work was followed by a series of walk-along and home interviews to gain an in-depth understanding of how the attributes that emerged as most important from the conjoint survey helped the participants to obtain a restoration of their emotional well-being through being in green spaces. The conjoint analysis results demonstrated that the relative importance of green space attributes differs by gender, visual condition and the emotional state caused by sight loss. The qualitative findings suggest that green space can act as a medium to promote emotional restoration by offering a compatible environment that motivates individuals to undertake the kind of outdoor physical and social activities that reduce social isolation. Taken together, the two most influential factors in relative importance and emotional restoration were individual affordance and social

company. The value of this research lies in identifying the landscape design attributes that are of the greatest importance to people with AMD. Such findings could help policymakers and landscape architects to provide better design solutions to include this group of people. They may also prove valuable as part of a new approach to enable people to deal with the emotional issues surrounding their late-onset visual impairment.

Acknowledgements

After more than three years, finally, my research and the writing of this thesis is over. The whole process has gave me precious experiences as I met and worked with numerous people, without whom this experience and its outcome would not have been the same.

First and foremost, I would like to thank to my sole supervisor, Professor Simon Bell, for his expertise and knowledge in teaching me how to conduct the research in my own pace, and for guiding me promptly whenever I needed. Then, I would like to thank Professor Emeritus Dr. Peter Aspinall, for guiding me in the journey of understanding the conjoint analysis and SPSS. Not forgetting, Professor Catharine Ward Thompson, for organising most beneficial student's seminars throughout the semesters, where I had learnt a lot from it.

I would like to acknowledge the Public Service Department of Malaysia for covering my tuition fees and also sponsoring living expenses for me and the whole family. My acknowledgements also extend to the Macular Society Support Group in Scotland and all the group leaders, who kindly agreed to help me in the social surveys.

Endless thanks to my husband, who is willing to be a full time househusband, looking after three children, while I was turning into a 'fulltime' student.

Many thanks to all my friends in Edinburgh, the UK, Malaysia, and the other part of the world, for the support and unforgettable moments that we shared.

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Chapter 1: Introduction

1.1 Introduction

Visual impairment has been reported as having a great impact on an individual's emotional well-being due to their visual deterioration (Marquès-Brocksopp, 2012; Popescu et al., 2012; Rebeiro et al., 2015) and reduced level of social activities (Nyman et al., 2010). People with this impairment will experience difficulty in recognising faces or unfamiliar things, or in seeing details and reading (Southwell, 2012). They have to be more attentive in their interaction with other people and the surrounding environment. These difficulties can also affect their feelings and, consequently, reduce their participation in physical and social activities. It can lead to reduced levels of outdoor mobility, particularly in green space. This situation may eventually place this group of people in danger of becoming socially excluded, thereby leading to a further decline in their emotional well-being (Charles, 2007).

In the field of landscape architecture, a wealth of research has already established empirical evidence regarding the beneficial effects of green space on health and well-being (Mitchell and Popham, 2007; Mitchell and Popham, 2008; Richardson and Mitchell, 2010; Richardson et al., 2010; Sugiyama et al., 2008; Ward Thompson, 2013; Ward Thompson and Aspinall, 2011; Ward Thompson et al., 2012). There is also specific evidence that demonstrates the benefit of green space to mental health (Mitchell, 2013; Ord et al., 2013; Alcock et al., 2014, Barton and Pretty, 2010; Nutsford et al., 2013). Therefore, it is essential to extend the benefits of being in contact with green space to various groups of people with disabilities, such as the visually impaired whose impairment developed later in life as a result of various causes. The benefit is predominantly to their emotional well-being.

However, knowledge about how green space could benefit this group of people in terms of their emotional well-being is still developing as a valuable research field. Moreover, it is acknowledged by the public and by support service providers that green space can be used as a rehabilitation space for people with disabilities (Marcus and Sachs, 2013), but it is not yet known exactly how green space can help people with a visual impairment in dealing with their emotional well-

being, especially when diagnosed in the later stage of their life. One particular disease that became the focus of the study is age-related macular degeneration (AMD). After cataracts, AMD is the most prevalent visual impairment disease among older people in the United Kingdom (RNIB, 2013a). Nonetheless, cataracts are considered to be a treatable disease through surgical procedure, leaving AMD as the main cause of irreversible late-onset visual impairment that often has a devastating impact on the emotional well-being of its sufferers.

In order to gain this understanding of how green space could be of benefit, it is first necessary to understand the priority set by this group of people regarding the characteristics of green space that are important to them. Then, the association between these priorities and their physical and emotional affordance is explored in detail. In relation to this, the study emphasises the preferences and priorities of the green space attributes, and also how these preferences can help late-onset AMD sufferers obtain the benefits of contact with green space.

It is hoped that the findings from this research can act as a set of recommendations to designers and policymakers for the development of sensible green spaces, with the aim of encouraging people with a visual impairment to use them in order to improve their outdoor mobility and thus eliminate social exclusion. The research recommendations could perhaps also be used in a new rehabilitation approach, by encouraging this group of people to use green space to improve their psychological well-being.

This chapter emphasises how this study derived its starting point, including the background and gap in the knowledge, and it discusses each step taken to develop the research design. It also includes a discussion of the significance of the study and, lastly, the overall thesis structure to enable a general understanding of the whole thesis.

1.2 Research background

Every time people converse about the visual impairment, certain stereotypes appear in their minds, including: an association with darkness, a white cane, a guide dog, being unable to read, an inability to recognise people’s faces and many more, all of which point to a sense of helplessness. This is viewed as stigmatisation by people

who have been diagnosed as visually impaired in the later stages of their lives. Most of them have difficulty accepting the fact that they have become visually impaired, and, in fact, they still anticipate that the public will treat them as 'normal' people. This behaviour is known as 'passing' (Southwell, 2012), and people in this situation do not normally realise that such behaviour could cause them greater disadvantage in managing their daily lives after becoming visually impaired. This is where counselling efforts should be emphasised, to eradicate this behaviour and also to help reduce the devastating impact on emotional well-being caused by visual deterioration.

The World Health Organization (WHO) has reported that, globally, the main causes of visual impairment, apart from congenital blindness, are cataracts followed by uncorrected refractive error, other causes such as accidents or unknown causes and then glaucoma and childhood blindness (Resnikoff et al., 2008). In contrast, due to the availability and affordability of refractive correction in advanced countries like the United Kingdom, the leading cause of visual impairment is reported to be AMD, followed by cataracts, glaucoma, diabetic retinopathy and ocular hypertension (RNIB, 2013e). Although cataracts are the leading cause of visual impairment in the world, however, they are a reversible impairment.

According to the Royal National Institute for the Blind (RNIB), almost 2 million people in the United Kingdom (UK) are living with sight loss and 360,000 people are registered as blind or partially sighted. Apart from that, estimates show that the number of people living with sight loss in the UK will increase in line with the ageing population to nearly 4 million people by 2050 (Charles, 2007). There are about 1.6 to 2.2 million people aged 65 years and over who suffer from some form of visual impairment, ranging from mild to serious in the level of deterioration in visual acuity.

There is increasing concern that visual impairment has the tendency to limit participation in social and physical activities (Popa et al., 2009; Swanson et al., 2012). Moreover, AMD and cataracts are major causes of visual impairment in older people and this group of people are already considered vulnerable and exposed to the risk of social exclusion, defined by the UK government as 'a person lacking one or a number of factors that are important for a good quality of life' as cited in Charles

(2007). In short, social exclusion is an experience characterised by deprivation and a lack of access to social networks, activities and services, which results in a poor quality of life, as reported by the office of the Deputy Prime Minister in 2006 (Charles, 2007).

The estimated numbers of people with visual impairment should not be taken casually as they do not just concern the elderly. A significant issue is a decline in all sufferers' quality of life after sight loss, regardless of their age. We should be mindful that among the three main causes of blindness mentioned above, cataracts and glaucoma remain the most common causes that can strike anyone, regardless of age (RNIB, 2013d). Furthermore, a poll in 2008 showed that vision loss is the most feared disability, while cancer and blindness are two of the most feared health conditions (WHO, 2012).

In Scotland, 188,000 are people living with significant sight loss, but only 36,000 people are registered as blind or partially sighted, as reported in the RNIB Scotland Annual Review 2011–2012. The cause of this large variance between the numbers of registered and unregistered people with sight loss requires further study, but it is expected that it can be attributed to some extent to the registration criteria and process, as well as a lack of information on how to access the service. The report mentioned that the main cause of sight loss is AMD, which normally affects older people, and it is estimated that the number of visually impaired people in Scotland will increase by almost 400,000 by 2030 due to the ageing population. These estimates have been used to urge policymakers and support service providers to be more alert and aware of future needs, mostly in supporting the social inclusion and emotional well-being of this group. As mentioned by the Scotland Regional Manager of the Macular Society in one of the support meetings in Edinburgh in 2015, the current estimate of the number of people with AMD in Scotland is around 500 people. The exact number is not known because most of them are not registered with either the society or the RNIB.

The main challenge in the current policy to eliminate social exclusion in visually impaired people, as laid out in the Scottish Vision Strategy 2008–2015, is empowering blind and partially sighted people to voice their thoughts and fears through a rehabilitation programme, participatory research and counselling. This has

become an effective participatory strategy to enhance the support system, particularly with regard to emotional well-being. The third strategy outcome drawn was to enhance the inclusion, participation and independence of blind and partially sighted people, and to focus more on improving the attitudes and actions of the public and service providers through awareness programmes, support group services, educational programmes and joint programmes with the public, to make full inclusion an accepted practice in Scotland (RNIB, 2012a). Hence, the role of green space in supporting this strategy is worthy of further investigation.

1.3 Type of visual impairment and causes

In advanced countries such as the UK, it has been identified that the leading cause of sight loss is AMD, followed by cataracts, glaucoma and diabetic retinopathy (RNIB, 2013e). AMD is an eye disease affecting the macula, a 'grain'-sized spot at the back of the retina containing millions of photoreceptor cells, called cone cells (RNIB, 2013a).

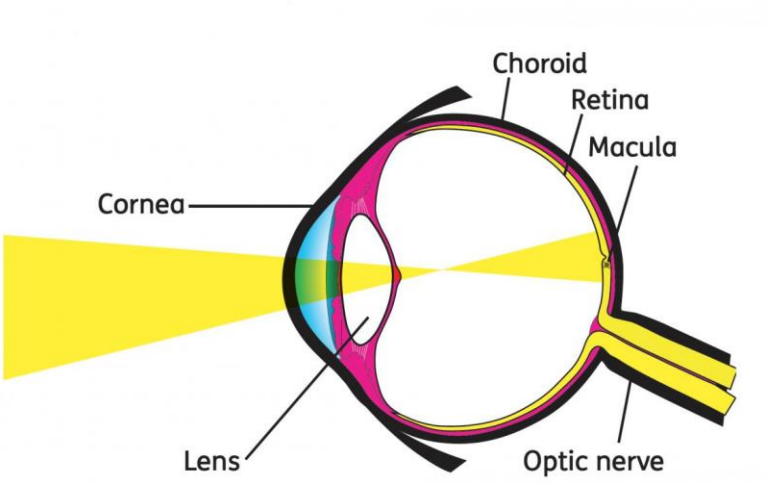


Figure 1.1 Cross-section of an eye showing the location of macula spot (source: Macula Society, 2015).

The macula is very important for seeing detail, colour (due to the predominance of cones) and things directly in front of the eye. AMD causes problems with central vision, but does not lead to total sight loss and the disease does not cause any pain. The actual cause of AMD is still not precisely known and people who suffer from it will have distorted or blurry vision and, over a period of time,

blank patches in the central vision may occur. Most AMD patients are older but it can also occur in children and young people, although this is rarely reported (Macular Society, 2015).

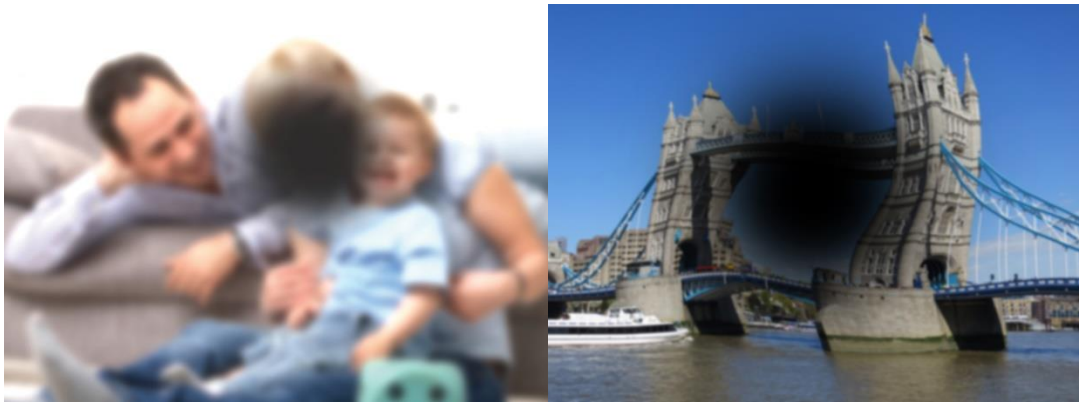


Figure 1.2 Examples of how the sight of someone with macular disease can be affected (source: Macular Society, 2016).

There are two types of AMD: dry AMD and wet AMD (Uribe and Buckley, 2013). Dry AMD is caused by a gradual deterioration in the macula over many years and occurs when the retina cells die off and are not regenerated. Dry AMD progresses over many months or years and the actual causal factors have not, as yet, been clearly identified. Currently there is no treatment to reverse the effect. In contrast to dry AMD, wet AMD can develop very suddenly, but it can be treated if diagnosed quickly. Wet AMD is caused by abnormal blood vessels that grow into the macula. The thin lining of the blood vessels is vulnerable to leakage and this can lead to scarring in the macula, which affects the central vision. Late-onset AMD is statistically most common in Caucasians, followed by Asians and Hispanic people. Africans are the ethnic group with the lowest occurrence of AMD because the presence of a high level of melanin protects the epithelial cells (Holz et al., 2013).

There are a few other types of macular conditions that affect the central vision and one of these is myopic maculopathy, which affects people with short-sightedness. The elongated shape of the eyeball causes the retina to become too stretched and possibly crack the membrane. Due to the natural recovery process, tiny new blood vessels begin to form, but these tiny blood vessels can leak blood, leading to scarring of the macula (Macular Society, 2012).

There is also another type of macular condition known as a macular hole. Three people in every thousand aged 55 and over have been reported to suffer from a macular hole, and the condition affects women more than men. It occurs when the jelly-like substance in the eyeball, called the vitreous gel, itself degenerates and becomes detached from the macula (Macular Society, 2012).

There is also another condition called retinal vein occlusion (RVO) that can occur at any age. This condition is caused by a blockage in the blood vessels formed by a blood clot, external compression or a disease in the vein wall. Common causes of RVO include smoking, high blood pressure and high levels of cholesterol (Macular Society, 2012).

Cataracts are also a significant cause of sight loss in the UK. These are mostly caused by natural changes in the lens (RNIB, 2013b). The lens becomes less transparent and subsequently vision becomes misty and cloudy. However, cataracts can be effectively treated with procedures such as lens removal surgery. Unlike cataracts, glaucoma occurs when the optic nerves have been damaged by increased pressure in the eyeball or a weakness in the optic nerves (RNIB, 2013d). The pressure is caused by a higher than normal level of aqueous fluid being produced by aqueous cells in the cornea area. There are four types of glaucoma that are normally diagnosed but the most common type is primary open-angle glaucoma. This affects the person very slowly, sometimes going unnoticed and does not cause any pain. Another, but less common type, is acute angle-closure glaucoma, caused by a rapid pressure rise; this is very painful. Furthermore, this type of glaucoma can cause permanent damage to the person's vision. Secondary glaucoma is another type that can emerge as a result of other eye conditions, operations, injuries or the taking of certain medications (RNIB, 2013d).

In addition to AMD, cataracts and glaucoma, diabetic retinopathy is another leading cause of sight loss in the UK, in which the deterioration in vision is caused by a blockage or leakage of tiny blood vessels in the retina (RNIB, 2013c). Generally, 40% of people with type I diabetes and 20% of people with type II diabetes are vulnerable to the development of diabetic retinopathy. However, vision remains normal if the leakage does not block the macula at the back of the retina. There are two types of diabetic retinopathy, namely maculopathy and proliferative

diabetic retinopathy. In maculopathy, the central vision is affected, leading to difficulty in seeing detail, such as recognising people's faces or reading small print. The other type is caused by the growth of abnormal blood vessels into the vitreous gel; these blood vessels sometimes leak and cause extensive haemorrhaging. This leakage can cause scar tissue to form, which eventually pulls and distorts the retina, resulting in serious sight loss (RNIB, 2013c).

1.4 Problem definition: Social inclusion and emotional well-being issues surrounding blindness

Many previous studies have shown that loss of sight has a remarkable negative impact on the quality of life and affects well-being, especially in the case of blindness in later life caused by an accident or disease (Marquès-Brocksopp, 2012; Douglas et al. 2007; Kirkcaldy and Barr, 2011; Gosney et al., 2009; Nyman et al., 2010). Facing the loss of a principal sense, those recently diagnosed with sight loss face major changes in their daily lives. This is a main cause of a decrease in the quality of life that may ultimately lead to social exclusion. This group of people tend be in danger of isolation due to the limitations in mobility and functioning imposed by the impairment. Consequently, this situation may also lead to a deterioration in their physical health, particularly among the elderly, arising from this limited mobility. Furthermore, visually impaired people often feel that reduced mobility is inevitable due to their situation – a kind of self-fulfilling prophecy (Douglas et al., 2012).

Conversely, there is also evidence that demonstrates the tremendous contribution of green space to people's well-being (Marcus and Sachs, 2013; Ward Thompson and Travlou, 2007; Ward Thompson et al., 2010; Bowler et al., 2010; Lee and Maheswaran, 2011). More specific research has also been conducted demonstrating the benefit of green space for emotional well-being (Herzog et al., 1997; Roe and Aspinall, 2011; Mitchell, 2013; Herzog and Strevey, 2008). This evidence was part of the motivation for initiating this research because there is a need for people with visual impairment to undertake more physical and social activities in an outdoor environment to avoid the decline in their quality of life noted earlier.

A report by Network 1000 Scotland, a project by the RNIB, revealed that emotional well-being has become a key concern in people with a visual impairment (Cairns et al., 2009). The finding shows that emotional well-being is very important in preventing a decline in the mental health of the visually impaired population. Due to the reciprocal relationship between physical function and emotional well-being, reduced vision is often linked to reduced physical function (Lin et al., 2004), and therefore inevitably affects the individual's well-being. A person's well-being covers not only physical and social aspects, but also emotional and spiritual aspects, therefore suggesting that emotional well-being is worthy of further attention in visual impairment research. (Marquès-Brocksopp, 2012).

1.5 Research aims and objectives of the study

The primary aim of this research is to build an understanding of the relationship between preferences for green space (related to different attributes) and emotional restoration from the perspective of visually impaired people with central vision loss caused by AMD, by examining the relative priority of these attributes and the emotional response generated through contact with them. It is also essential to investigate how this finding could be related to a sense of well-being, particularly emotional well-being. The broader aim of this research is to enable the findings to be directly translated into policy and design recommendations to help increase the social inclusion of visually impaired people through the provision of appropriate green space. The detailed objectives of the study are to examine:

i) The important features of green space from the perspective of people with late-onset AMD.
ii) The type of activities people with late-onset AMD engage in when visiting green space.
iii) The need for green space for leisure time activities.
iv) The relative importance of green space attributes as perceived by the participants.
v) The effect of green space exposure and use on the emotional well-being of the participants.

1.6 Scope of the research

The study focused on people with late-onset AMD because many previous studies have identified the association between this particular disease and a decline in emotional well-being, affecting quality of life (Lupsakko et al., 2002; Ribeiro et al., 2015). Moreover, AMD is the most common cause of sight loss in the UK (RNIB, 2013a). Some diabetic retinopathy patients also suffer from central vision loss. This condition is called maculopathy. Its effects are similar to those of AMD. However, the population of people with maculopathy diseases caused by diabetic retinopathy is smaller compared to that for AMD (RNIB, 2013c). Therefore, this study will not involve people with diabetic retinopathy despite it also being a cause of central vision loss.

Despite the fact that glaucoma is one of the leading causes of sight loss and can affect people regardless of their age, it is excluded from this study because there is evidence that glaucoma patients are more concerned with their vulnerability to central vision issues as the disease progresses, as opposed to the real condition of the disease, which is peripheral vision loss (Aspinall et al., 2008). This means that central vision loss is the biggest concern for all people who are visually impaired, regardless of the eye disease they have.

Another recently study concentrated on how glaucoma patients perceive their vision loss. Surprisingly, it found that as many as 26% of glaucoma patients were not aware of their vision loss. Most of them reported having some blurred patches, and just 4% had the blurred tunnel vision that characterises the disease (Crabb et al., 2013). This evidence shows that glaucoma does not have such a great impact on patients' lives, compared with those people who have central vision loss, such as those with AMD. Furthermore, glaucoma and cataracts are considered to be treatable conditions.

With regard to ocular hypertension, this is not considered a disease per se, but rather a symptom of high pressure in the eyeball. It does not yet affect the vision. It was included as part of the criteria for an eye health examination in the UK because ocular hypertension can develop into glaucoma if not treated early (RNIB, 2013e).

1.7 Significance of the study

This study will consolidate the evidence regarding the beneficial links between people and green space, from the perspective of visually impaired people. This specific scope is currently being given limited attention, particularly in landscape architecture studies. The knowledge acquired from this research will open up more opportunities and bridge the gaps in studies involving people with disabilities and the benefits of green space. The findings of this research will also help to strengthen the prevailing theories about the relationship between humans and the natural environment, by testing them on different groups of people with disabilities. In the context of this research, visually impaired people suffering from late-onset AMD were selected as the study population.

Underpinned by the concept of affordance, this research was conducted to unravel the relationship between emotional affordance and preference, and how it supports the promotion of emotional well-being through contact with green space. A series of recommendations were developed from the findings of this research. These could potentially be used to develop specific guidelines for landscape architects and policymakers on how to plant and design suitable green space to encourage people with visual impairment to use it. Such provision may improve their outdoor mobility, and consequently, eliminate social exclusion. Apart from that, the recommendations can also be used as part of a new rehabilitation strategy in tackling the psychological health and well-being issues of people with disabilities, particularly those with a visual impairment, by encouraging them to make more frequent use of green space.

1.8 Structure of the thesis

This thesis comprises seven chapters. The first chapter is the introduction. It provides comprehensive information on, and a detailed background of, the research initiative, together with the issues that motivated the research. The main research aim, which focuses on an investigation into preferences regarding green space attributes, is provided in this chapter. This chapter also states the scope and limitations of the study, followed with the significance of the study.

Chapter Two focuses mainly on the literature review principally carried out at the initial stage in order to identify the research gaps. The literature is divided into three distinctive themes, and, thus, the review is constructed according to these themes. The first theme looks at green space and general well-being in people with regard to the benefits of green space. The next theme discusses well-being and visual impairment, focusing more on emotional well-being. The third theme covers the literature on the visually impaired and an outdoor environment. The research gap is explained and discussed in this theme. It was evident from the review of the literature that the benefits of green space for visually impaired people have been under-researched, and this study attempts to fill this gap to some extent.

Chapter Three looks at the underpinning theories and concepts that best fit the theoretical framework with regard to visually impaired people and their relationship with green space. This chapter focuses on the concept of affordance, which does not merely apply to physical ability, but also applies to the emotional side of people with visual impairment. Then, the relevant theories that support the restorative benefits of green space are also presented.

Chapter Four is written especially to justify the framing of the research question based on the two previous chapters: the literature review and the theoretical framework. It basically explains the gap found in the literature and how the theoretical basis helps in framing the research question and objectives as well as leading on to the choice of the research strategy and framework.

Chapter Five explains the research strategy and methodology used in detail and the procedure employed in the research to obtain the data. This chapter is also divided into three sections based on the purpose of the data collection methods, which are: first, to identify the important features of green space from the perspective of visually impaired people; second, to find out about the relative importance of the green space attributes for people with visual impairment; and finally, to understand the priorities set by the visually impaired that influence their emotional restoration in the green space. Furthermore, detailed steps of the data analysis are presented and any limitations of the method employed are highlighted in this chapter.

The results are kept separate in Chapter Six, while the interpretation and triangulation of the findings are presented in Chapter Seven. Chapter Six

concentrates on the results obtained from the data collection, which are presented in the same order as in the methodology chapter.

Chapter Seven, the final chapter, consists of the interpretation and discussion of the results, which are presented in thematic order as per the sequence of the research sub-questions. The conclusions to the thesis are also presented in this chapter and an overall conclusion to the research is reached by answering the research questions. The limitations of the research and areas that have been identified as being need of further research are also presented in this final chapter. Chapter Seven also provides recommendations regarding the landscape design attributes most suited to the needs of visually impaired people and which, at the same time, may contribute to their emotional well-being. The recommendations put forward in this chapter could also be used as the basis for a new approach to a rehabilitation strategy regarding visual impairment and emotional well-being issues.

Chapter 2: Literature review

2.1 Introduction

The benefits of green space have been discussed widely due to their huge contribution towards the general well-being of people. This chapter presents some of the existing literature regarding the benefits of green space to people, well-being and visual impairment. The chapter is presented according to three different themes because each theme is related to the others but in a rather different way, based on the discipline in which it is studied. The review is organised by presenting a broader discussion and critique of each of the themes and, later, the discussion is more focused on specific work in the field of green space and visual impairment. This chapter therefore aims to present the previous and current research across disciplines and, later, put the discussion together with the theoretical background to establish the research framework. This chapter is guided by the following themes:

i. Green space and well-being
ii. Well-being and visual impairment
iii. Visual impairment and the benefits of green space.

The intersection of the themes will be discussed later and presented as the research gap that generated this study. The theoretical framework is presented in the following chapter as a basis to strengthen the identified gap, which later becomes the underpinning framework to the development of the research questions and methodology of this research.

2.2 Green space and well-being in people

Urban green space is important in cities because it provides integral support to the people and wildlife living in those cities. Thus, a large amount of research has been carried out to obtain a better understanding of people's relationship with green space. Accordingly, researchers are continuously investigating the ultimate quality of green space in order to establish the positive link in that relationship. Despite the

large amount of current empirical evidence, a challenge remains in finding literature that is specifically focused on the quality green space attributes that benefit people with disabilities, particularly those with a late-onset visual impairment.

There are a few common design aspects that are normally implemented in sensory landscape design, such as general accessibility, aesthetic value, maintenance, planting design, quality of the surface equipment, safety and the spatial location of the garden (Hussein, 2009). However, these design aspects are gathered from the point of view of the landscape designer, and it is expected that by implementing these design criteria the green space will serve as compatible outdoor space for users with disabilities.

The study of preference with regard to green space attributes is extremely important in determining the beneficial relationship between people and green space that contributes to general health and well-being. Despite many claims that green space provides a major contribution to physical well-being, there are evidence showing that the contribution is actually weighted predominantly towards emotional well-being, as some of the main reasons for visiting green space are for relaxation and relieving stress arising from daily activities (Herzog et al., 1997; Roe and Aspinall, 2011; Bowler et al., 2010; Schipperijn et al., 2010; Brook, 2010; Ward Thompson, 2013; Ward Thompson and Aspinall, 2011). However, there is no clear boundary between the emotional and physical benefits; both show the reciprocal relationship in general health and well-being.

Some research has aimed to highlight the social benefits of green space in the broader spectrum, such as providing recreational opportunities, aesthetic enjoyment, increasing physical and emotional health, encouraging social ties and providing educational benefits (Zhou and Rana, 2012). However, these benefits actually impinge on each other and would benefit from further research to increase understanding of the causal link, particularly in different groups of people with different disabilities.

2.2.1 Green space quality and preferences

Accessibility is always a subject in a quality assessment surrounding normal and healthy people and is pertinent to the use of green space. The main factor is

commonly proximity to the home (Nilsson et al., 2011; Ward Thompson et al., 2004). However, this may not be the main criterion in the view of people with a visual impairment. This hypothesis is mainly due to the fact that people with normal vision always think about how to get there, but for those with a visual impairment, what is there is much more important than how to get there. This is the point where a preference study of green space attributes can provide significant information to supplement the original assumption.

For example, the supporting evidence has demonstrated that a greater level of access to a neighbourhood park is more important than for an urban park because the younger residents use it for recreation and meeting people, while the older residents use the park as a place to relax, to escape from the stress of daily life and to enjoy natural amenities. Moreover, it is also somewhere for children to play (Wright Wendel et al., 2012).

It is always important to evaluate preferences for attributes in determining the quality of green space design because they are directly linked to behaviours and perceptions. These behaviours and perceptions will lead to frequent usage, which is the most important criterion used to determine the success of an attribute in green space classification by the residents of the neighbourhood (Hofmann et al., 2012), whilst, from the point of view of older people, nuisance becomes the most important attribute of green space quality (Aspinall et al., 2010).

However, there is no definitive attribute to use in assessing the quality of a green space. Bell and Ward Thompson (2004) proposed the idea of three interrelated concepts that construct a green space. The first is structure, which represents the physical condition of the green space that will eventually influence the second concept, action, which represents the activities occurring in that space. The third concept is image, representing the perception of people towards the green space. This perception is triggered by both the structure and the action offered by such a space. Therefore, the provision of high-quality green space must incorporate all of these concepts in order to offer greater benefits for general well-being.

Apart from that, an effort has been made to classify the assessment criteria for quality green space by studying the preferences of the people in the neighbourhood. Gidlow et al. (2012) list five domains by which to assess green space

quality: accessibility, recreational facilities, amenities, natural features and incivilities. These criteria, when examined closely with the other empirical findings, reveal that the most preferred attribute is anything related to nature, such as the state of the vegetation and the natural setting (Ahmad et al., 2011; Jim and Chen 2006; Hofmann et al., 2012; Ward Thompson and Aspinall 2011; Bowler et al., 2010).

A more specific study on green space preference was conducted recently, the findings of which suggest that preference is also influenced by innate significance. This means that people prefer a type of landscape that represents their cultural and ethnic background (Adevi and Grahn, 2012). The authors suggest that preference is linked to innate and cultural factors and the major influence is childhood experience. Therefore, referring to this evidence, this study will later identify whether the preferences of people with a visual impairment are influenced by either innate or cultural factors. Then, the identified factor can be made one of the criteria in the provision of high-quality green space for these people.

2.2.2 Definition of green space

The term ‘green space’ has been widely used in the literature and is always associated with space having landscape elements, such as plants and hard surfaces, whether natural or man-made. To be more specific, the term green space is used to emphasise the green environment, particularly in urban areas, not only to refer to parks and gardens but also when referring to open space. However, public open space often has its own explicit definition, such as land laid out as a public garden, public recreation area or burial ground, as specified in Section 336 of the Town and Country Planning Act 1990 (Swanwick et al., 2003) and such space is normally managed by a local authority. Thus, public open space should be considered a subset of green space. According to Swanwick and colleagues, green space is predominantly permeable and soft-surface land, between buildings in an urban area, in contrast with grey areas (land that consists predominantly of sealed, impermeable hard surfaces). Typologically, the space has been divided into four categories of space: amenity space, functional green space, semi-natural habitats and linear space. These categories are characterised solely by the function of the space.

However, according to Bell et al. (2007), the categorisation of public green space seems to be more straightforward in terms of the main types of green space, which include parks and gardens, green corridors, amenity green space, allotments, communal gardens, urban farms and public spaces. Some of these categorisations also apply to private green space. There are also subtypes of green space, such as natural and semi-natural spaces, outdoor sports facilities, space for the use of children and young people and cemeteries and burial grounds. In relation to this research context, the categorisation of green space is not crucial, because it is not a primary research parameter, as the research will look specifically at the attributes of the green space, regardless of its typology. However, the scope of the study mostly involves neighbourhood parks because these are usually in the vicinity of the participants' homes. Nonetheless, the attributes identified should generally be applied to all types of green space.

2.2.3 Environmental attribute versus green space attribute

Many terms have been used in the literature to describe green space attributes. For example, in the development of a tool to evaluate neighbourhood park quality, the term 'green space domain' was used to assess the quality of green space based on its appearance, maintenance and the presence and quality of various features (Gidlow et al., 2012). The domains used in green space preference studies are quite broad and need to be broken down into detailed attributes. However, the suggested domains can be used as a preliminary idea for use in generating detailed green space attributes. In a study of older people's preferences with regard to neighbourhood open space, the attributes are specified in much more detail and are termed 'environmental attributes' to describe both the physical and environmental features of green space. The findings demonstrate that older people prefer a neighbourhood park which is without nuisance, has facilities, many trees and plants, light traffic en route to it, wildlife to watch and is well maintained (Alves et al., 2008). Since the attribute 'nuisance' is the main priority among older people, it is expected that the same attribute may also be a priority for people with AMD, noted as being a disease that predominantly affects older people. Referring to the attribute 'nuisance', this cannot be classified as a physical design attribute, but is more a

social feature such as incivilities, dog mess, graffiti and rubbish, among many others. In order to ensure that the research covers all aspects of physical and social as well as environmental attributes, the term ‘environmental attribute’, as defined in the study by Alves and colleagues, is much more appropriate.

Conversely, the purpose of this study is to find the most important physical design attributes that can potentially promote emotional well-being among the visually impaired. Therefore, negative features such as incivilities and nuisance will not be included in the choice-based survey questionnaire. This is to ensure that the results, with regard to the preferences, are not affected by these features. Therefore, the term ‘green space attribute’ is much more appropriate for use throughout this study.

2.3 Well-being and visual impairment

2.3.1 Classification of visual impairment

Visual impairment has been classified into a definition where it can be clearly distinguished from one category to another. According to the WHO, the definition of visual impairment is generally based on ‘best-corrected’ vision as stated in the International Statistical Classification of Disease, Injuries and Causes of death, 10th revision (ICD-10), H54 (Resnikoff et al., 2008). Measurement is based on the visual acuity obtained after the best-possible refractive correction. In other words, such visual impairment can easily be corrected with spectacles or other refractive corrections to achieve normal vision. However, the term ‘best-corrected’ vision has been identified as overlooking a large number of people with a visual impairment, including blindness, due to uncorrected refractive errors (WHO, 2008). As a result, it has been recommended by the WHO that the term should be changed to ‘presenting’ when applied to the definition of visual impairment. This means that visual impairment should be defined based on the visual acuity obtained with currently available refractive correction, if any (Holz et al., 2013).

In accordance with the WHO’s definition of visual impairment, the RNIB has established a definition of visual impairment by categorical determination, based on visual acuity and visual field. Nevertheless, these categories are used merely for the

purpose of the process of registering as visually impaired (RNIB, 2012b). The basic definition of visual impairment continues to refer to the WHO definition.

There are two categories of visual impairment specified by the RNIB, based on the measurement of visual acuity and visual field. The first category includes those defined as being severely sight impaired or blind. This category is measured according to three discrete levels: visual acuity of less than 3/60 with full visual field; visual acuity between 3/60 and 6/60 with severe reduction of field vision, for example, tunnel vision; and, lastly, visual acuity of 6/60 or above, but with a very reduced field of vision.

The second category refers to those termed as sight impaired or partially sighted. This category is also divided into three discrete levels: visual acuity of 3/60 to 6/60 with a full vision field; visual acuity up of to 6/24 with a moderate vision field, for example, cloudy or blurry vision; and, lastly; visual acuity of up to 6/18 with a large part of the vision field missing.

Visual acuity is measured using a Snellen chart (see Appendix 1), which consists of a number of rows of numbers, letters or graphical characters which become smaller towards the bottom of the chart. Graphical characters are normally used for assessing small children or adults with literacy problems. The acuity is defined on the basis of distance of visual acuity. For example, the top number is the distance that the person being assessed can see and the bottom number is the distance that normally sighted people can see. This means that the larger the bottom number compared to the top number, the worse the person's vision. The measurement for good eyesight is when the top and bottom numbers are the same, for example 20/20 or 6/6, depending on the measurement unit being used in the chart.

However, visual acuity is not the only measure used to determine blindness. The visual field should also be measured with the use of clinical measures. This is defined as the deteriorating field of vision and contrast sensitivity, which normally occurs in late-onset blind people due to disease or accident.

These classifications have applied to all types of visual impairment regardless of the cause of the impairment. In the case of late-onset AMD, these classifications are merely used for registration purposes by the RNIB. However, there are a majority of people with AMD who do not register with the RNIB, for reasons unknown.

Therefore, this study has not employed these classifications in determining the study participants' degree of sight loss. Furthermore, any clinical measures that require medical expertise need to pass through a lengthy process of ethical approval. Due to the explorative purpose of this study, rather than to confirm a hypothesis, assessment of participants' levels of vision was carried out using self-reported data.

2.3.2 Visual impairment and emotional well-being

Previous literature has shown that being visually impaired can have a devastating impact on emotional well-being (Marquès-Brocksopp, 2012; Cairns et al., 2009; Nyman et al., 2010; Orzolek-Kronner, 2013). The reason for this is because of the functional and cognitive decline experienced by the individual with sight impairment (West et al., 1997; Lin et al., 2012). According to Lin and colleagues, functional decline involves reduced ability to perform daily routines and tasks, while cognitive decline is a reduction in memory and concentration. Cognitive and functional decline typically contributes to an individual's reduced mobility, particularly in the outdoor environment, thereby exposing such an individual to social exclusion.

Well-being should be considered from a more holistic standpoint, including physical, social, emotional and spiritual well-being. There is significant evidence that links emotional well-being and constructs such as optimism, resilience and self-esteem (Marquès-Brocksopp, 2012). This link is important to this study because these constructs will be further investigated in the case of visually impaired people in order to understand how they manage their emotional well-being.

According to Ryan and Deci (2001), well-being is a complex construct that concerns optimal experience and functioning. It is represented by two approaches: hedonic, which focuses on happiness; and eudemonic, which focuses on meaning and self-realisation. From the perspective of hedonic psychology, Kahneman et al. (1999) defined well-being as 'an aggregate of psychological sentiments and evaluation of one's own life' (p.131). Hence, well-being is best defined by the individual himself or herself, although many clinical measures have been used to assist in the interpretation of the definition.

Some common factors behind reduced emotional well-being in visually impaired people are feelings of shock, lack of confidence, the onset of fear, self-doubt, depression, grief and vulnerability (Percival, 2005). Although reduced emotional well-being has been reported as affecting only a small number of individuals with vision loss, the duration and severity of this loss of vision have nonetheless not been taken into consideration in the studies (Nyman et al., 2010). It is a significant step to include the duration and severity of sight loss, which may influence the condition of emotional well-being. Further studies are recommended to demonstrate the relationship between these variables and emotional well-being.

There is little evidence currently available in relation to the effect of a longer duration of loss of vision and the impact of this on emotional well-being. Therefore, it is hypothesised that the longer the duration of one's sight loss, the better one is able to cope with the impairment. This hypothesis is supported by research carried out by the RNIB exploring participants' mobility and travel behaviour. The research found that those participants with a more severe impairment worried about their vision the most and had lost their sight more recently. The findings concluded that people who had lost their sight during the last seven years or less put more focus on individually based barriers such as difficulties with their eyesight that caused them to have less mobility (Douglas et al., 2012). This suggested that the duration of sight loss could be used as a baseline in this research.

2.4 Visual impairment and green space

Although the benefits of green space have been widely studied across the world, there is still a gap in the research literature with regard to visually impaired people and green space. Nonetheless, there are some important findings in psychological science research that could be used in the establishment of any research effort that aims to narrow this gap. It could be used, for example, in a research that aims to ensure the visually impaired become socially included in the outdoor environment, such as in green space.

Referring to the context of this research, it is suggested that people with late-onset visual impairment should also experience and appreciate green space as much as they did prior to their sight loss and, furthermore, could benefit from it as much as

normal-sighted people. Due to the reciprocal relationship between people's emotional and physical well-being, this will in theory lead to a better life for visually impaired people.

However, there are some concerns that the researcher must be aware of when researching visually impaired people and green space. There is evidence that this group of people have a 'perception of difficulty' in their mental landscape that may cause a negative response before they really interact with the physical environment (Gustafson-Pearce, 2005). Two things are perceived as difficult by the visually impaired before they get in touch with the environment; these are sound and equipment. In the case of the elderly with vision loss, most also have hearing difficulties and this perception may directly affect their outdoor mobility.

On the other hand, poor vision has been shown to be the main predictor in an increased risk of a fall, especially when combined with hearing loss (Kulmala et al., 2009). There is yet another study that focuses solely on mobility decline, attributing it not only to multiple sensory loss but also to the perception of 'fear of falling' (Viljanen et al., 2012). These factors may contribute to the reduced outdoor mobility of people with visual impairment, especially the elderly. Fear of falling (FOF) is defined as 'a lasting concern about falling that leads to an individual avoiding activities that he or she remains capable of performing' (Tinetti and Powel, 1993).
In older women, combined sensory difficulty is the most significant predictor of FOF because sensory loss reduces their confidence in maintaining their balance (Viljanen et al., 2013). The authors argue that FOF leads to older people avoiding environments they perceive as hazardous. Certain elements of the built environment contribute to a perceived FOF when they pose hazards, such as uneven pavements, poorly lit areas, street design in terms of its construction and associated traffic patterns, inadequate visibility of cyclists, motorized children's toys and weather-related influences (Chippendale et al., 2015). The degree to which green space is maintained is also important for the elderly as this is associated with their safety in the living environment (Kemperman, 2014). These findings suggest a tendency for elderly people with AMD to avoid using green space due to a fear of falling.

2.4.1 Visual memories in the late-onset visual impairment

Deterioration in vision may be the most feared situation in one's life. It differs, however, from life-threatening diseases. The key to surviving emotional depression is maintaining good emotional well-being, which will assist overall health and well-being. One aspect that is in need of further in-depth research is how visual memories can help to maintain emotional well-being following loss of vision. In some of the literature, visual memory is termed as visual experience or imagery (Heller and Ballesteros, 2012). Some previous research has aimed to explore the role of visual memories in people who develop visual impairment later in life. The findings are conclusive regarding one point, which is that visual memories make a major contribution towards spatial tasks. It has been demonstrated that late-onset blind people perform tasks more accurately than those with congenital blindness and they also perform as well as normal-sighted people (Pasqualotto et al., 2012; Toroj and Szubielska, 2011).

The studies have concluded that having visual memories in life encourages late-onset blind people to use an allocentric or all-centric strategy in spatial tasks, rather than egocentric strategies, which are used by people with congenital blindness. This suggests that people who develop visual impairment later in life, such as AMD and maculopathy patients, may have a similar ability to normal-sighted people when experiencing green space and it is also expected that they may have similar preferences to normal-sighted people. One evidence in a blindness study supports this proposition. It shows that the recruitment of visual areas in the brain is common in congenitally blind people (Proulx, 2013). This means that the brain has the ability to visualise objects based on haptic and olfactory stimuli, called brain plasticity, as mentioned in Sadato, Okada et al. (2002) in Toroj and Szubielska (2011).

Conversely, there is not enough evidence regarding the contribution of brain plasticity in the late-onset blind as compared to the congenitally blind. It is not known how olfactory stimuli help in cognitive mapping in older people with sight loss, especially in the outdoor environment. Jacobson (1998) defined cognitive mapping as 'a process composed of a series of psychological information by which an individual acquires, stores, recalls and decodes information about the relative locations and attributes of the phenomena in his everyday spatial environment'. This

is used in relation to environmental preferences for modes of transport, shopping, recreation, housing and learning about a new environment. Jacobson (1998) concludes that cognitive mapping can be used in landscape studies to improve the quality of life of visually impaired people through increased mobility and independence. Memories of a place can support older people's independence in the outdoor environment (Philips et al., 2011). The authors argue that in familiar places, independence is encouraged through memories of events and situations that have taken place within that particular space. Therefore, people with AMD may experience a better quality of life by becoming more independent in the outdoor environment, especially in green spaces. The definition of the quality of life in the context of a vision-related study means the degree to which a person's vision prevents them from carrying out a range of tasks (Ward Thompson and Travlou 2007, p.182).

2.5 Summary

This chapter provided a review of the empirical evidence in both green space and visual impairment studies which is pertinent to general well-being, and presented it in separate themes. It then focused specifically on the empirical findings of studies that are closely related to emotional well-being. Green space has been proved to have a huge impact on emotional well-being. Some studies have identified that having a visual impairment has a great impact on emotional well-being, although this might not affect all people; it depends on the duration and severity of the sight loss, and it is also believed to have a relationship with the resiliency of the individual.

The last theme of the review was emphasised in order to unravel any empirical evidence in studies involving people with a visual impairment and their contact with green space. Scant empirical evidence regarding this matter versus an abundance of evidence of the benefits of green space in general have raised queries about how having contact with green space can also benefit people with a visual impairment in coping with their emotional distress. The next chapter explores the theoretical framework that shaped this research to examine more closely the gap in the studies with regard to the benefits of green space for people with a visual impairment.

Chapter 3: Theoretical framework

3.1 Introduction

The previous chapter reviewed the empirical evidence of three different, but interconnected themes. The first theme was about green space and people's general well-being. The second theme was about well-being and visual impairment and, lastly, the third theme was about visual impairment and green space. Each theme has its own gap but they are all simultaneously interwoven.

Therefore, this chapter aims to bring together these three separately interconnected themes through a theoretical framework. As mentioned in Chapter Two (Section 2.2.1), Bell et al. (2004) state that the quality of green space is constructed according to three elements: structure, action and image. This present study is based on this paradigm as a framework for understanding the benefits of green space for the target group, with the concept of affordance as the underpinning theory.

3.2 Affordance in relation to the visually impaired in the green space

According to Kaplan (1995), the environment setting must fit with what the people would like to do, and they should be able to do this with less directed attention or focus. This can only be achieved if the environment fits the purpose of the people's demand and also provides the information needed for that purpose. The information is normally related to the individual's previous experience, the context in which it occurs and also their expectation. This information leads to the perception of the environment. It serves as a motivational factor for people to visit green space. Other motivational factors include hope, desire and emotional attachment (Ward Thompson et al., 2010). The perception will influence the choice of priorities with regard to green space attributes.

In Attention Restoration Theory (ART), Kaplan describes four environmental properties that encourage the restorative process by inhibiting distraction in order to direct attention. First, the environment must have the property to offer the sense of *being away*, which makes the person gain distance from unwanted distraction and

providing an escape from habitual activities. Second, the restoration process may occur by person's engagement of aspects of the environment that capture attention effortlessly. Such engagement is called *soft fascination*. It promotes rest for the directed attention. Third, fascination is prolonged when the environment offers the sense of *extent*, attributed to the scope to feel immersed in the environment. The fourth properties of the environment are suggested by the author is *compatibility*, which refers to the attribute of the environment that fit with what the person wants to do, must do and can do with the environment.

Kaplan suggests that restoration effectiveness can only be achieved through the recovery of directed attention, or in other words, 'involuntary attention', a form of attention that is resistant to fatigue. Kaplan (1995) later altered this term to fascination. Fascination is a certain characteristic that provides a special advantage in enhancing the benefits of recovering from directed attention fatigue, as suggested by Kaplan (1993) and as cited in Kaplan (1995). Fascination may be hard or soft, and it is a main key of the restorative process. In normal-sighted person, fascination can derive from the process of anticipating something or from there being an element of mystery when walking in the park. However, for the visually impaired, having to predict something, and the uncertainty that goes with that, can be a source of apprehension, particularly in the outdoor environment. Thus, there needs to be a balance between fascination and the compatibility of the space for this group of people, particularly in green spaces. Kaplan argues that a compatible environment offers a slow process of perception that nurtures restorative benefit. Kaplan's idea is supported by various traditional perception theories. One of these was developed by Gibson in the 1970s and stated that perception is indirect and mediated by a higher cognitive process (Greeno, 1994). In contrast, another theory states that perception is a rapid process that can take place independently (Ulrich et al., 1991). It is also primarily related to the cognition process. The author's view is supported by some empirical evidence, which demonstrates the rapid restoration effect of visual perception in a stress-recovery experiment. However, a focus on visual perception is not suitable when dealing with the visually impaired.

From the perspective of the psychological view, as mentioned in Bickhard and Richie (1983), cited in Greeno (1994), perception is a slow process that involves

analysing cognition and it is relatively different for each person. This is where the term affordance comes from: referring to the theoretical terms used to describe the aspect of the interaction between humans and the environment. The affordance concept is used as an effort to understand how the environment supports cognitive activity. However, Gibson focuses only on the contribution of the physical system, for example, the environment and people or animals. Besides, from the perspective of environmental studies, affordance is an attribute that has the possibility to offer actions and constraints, or things that capture our intention to do something (Heft, 2003). Heft argues that people perceive the environment in two ways. The first is a first-order experience, which is a direct and unmediated perception, known as awareness. Second is the order mode of knowing, i.e. acts of cognition, an intentional focus arising from experiences. This is where affordance takes place, because people experience the object and the events of the world in relation to each other.

In this research context, affordance is focused on both aspects. From the psychological view, the research is focused on how visual impairment and the emotional state of the participants shape their preference for green space attributes. Meanwhile, from the environmental studies view, affordance is focused on the opportunity or constraint offered by the attributes in the green space.

Pertaining to late-onset visually impaired people, perception tends to be based on visual memories (Proulx, 2013) and emotional affordance (Russell, 2003), as these are the first things that emerge when visually impaired people come close to the outdoor environment. Visual stimuli no longer play a major role in determining perception, and stimuli deriving from the other senses will eventually take their place in playing an important role, with the help of visual memories of previous experiences (Bell, 2012). Besides, there is information contained within the environment that can help visually impaired people to perceive it, such as microclimate, other sensory stimuli, emotional state and a sequence of experiences in the environment (Ward Thompson et al., 1998). These support Kaplan's notion that perception is a slow process. These intervening factors may also develop into the idea of green space quality that suits people's affordances, as illustrated in the figure below:

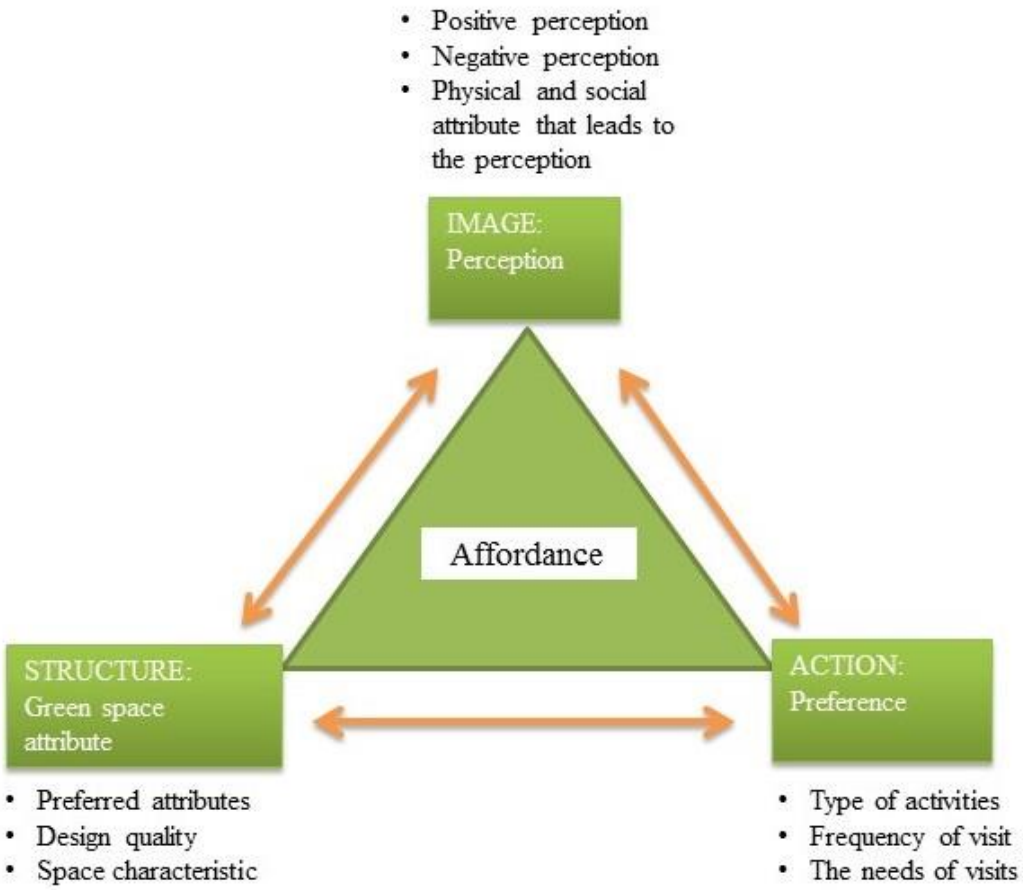


Figure 3.1 Illustration of the intervening factors of green space quality adapted from Bell and Ward Thompson (2004).

The model illustrated is an example of the application of landscape architecture research adapted from the 'Theory of Place' by Canter (1977) in which the author suggested that the place is made up of the three interconnected components: conceptions, activities and physical attributes.

3.3 Restoration of emotional well-being in the green space

In the discourse of emotional affordance, the concept of emotion has been described in detail by Russell (2003), and this is the best way to understand one's emotional state. It is part of the theoretical framework in evaluating the emotional restoration of visually impaired people and its relationship with preferences for green space attributes. According to Russell, the emotional state or feeling has two

dimensions, i.e. a pleasure-displeasure and activation and de-activation. This circumplex is known as the core affects.

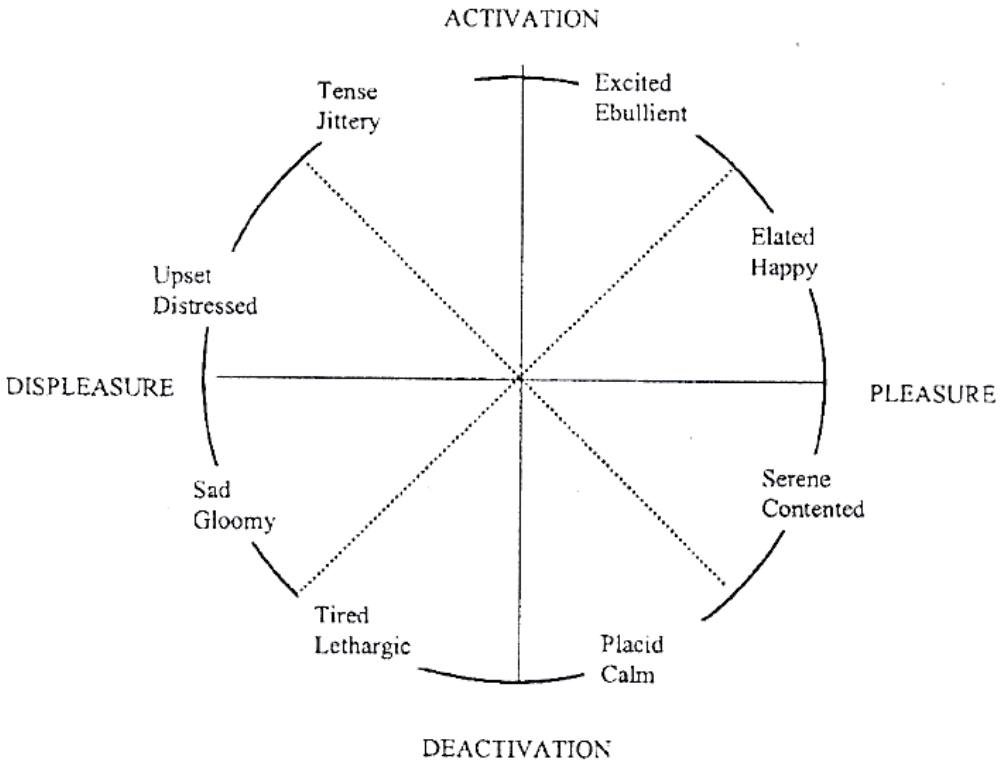


Figure 3.2 Core affects from Russell (2003).

The concept of core affect exists within people whose dimensions differ from each other depending on various different conditions and influences. Russell describes core affect as affective feelings, which are an assessment of one's current condition. The core affect can also be experienced without any influence and stimuli, as seen in mood. This suggests that a person's mood can be measured to determine their emotional state. Referring to the concept of core affect, the study will focus on the aspect of the emotional affordance of visually impaired people that is influenced by various attributes in green space. This is because green space has been proven to play a part in the restoration of emotional well-being.

This proposition is supported by the psycho-evolutionary Theory by Ulrich et al. (1991) which suggests that exposure to a natural setting can reduce stress and improve mood. Kaplan's (1995) Attention Restoration Theory (ART) also supports the same proposition, that is, emotional restoration can also take place in a green

space provided that the green space is fit for the individual's needs. Both theories originate from Ulrich's (1983) earlier version of stress reduction theory and Kaplan's (1989) capacity to focus attention, as cited in Herzog et al. (1997). Knowing that people with a visual impairment are emotionally affected by their sight loss, they need a responsive setting in which to recover from the mental distress caused by the inevitable changes in their lives. Therefore, a green space setting needs to be a setting that can restore these people's emotional state by providing them with a feeling of fascination, being away, contentment and of being in a compatible environment.

Both of these major theories Ulrich and Kaplan focus on mental restoration, but in different ways; the restoration effect occurs either as a rapid or slow process. In the case of the visually impaired, perception is a slow process because cognitive mapping, especially in a larger environment like an area of green space area, needs full attention due to the lack of visual stimuli. The preferences and priorities of the visually impaired become different from those of normal-sighted people and thus the perception is merely based on what they need in such an environment.

3.4 Summary of theoretical framework

The theory underpinning this research is the concept of affordance, developed by Gibson in the 1970s (Gibson, 1977). The concept refers to the association between people's behaviour and those features of the environment that offer opportunities for action. Gibson argues that the physical attribute of nature could offer potential for different types of activities (e.g. for exercise). In the field of landscape architecture, the concept of affordance was refined by Heft (2003) to mean the functional properties of an environmental attribute for people. In parallel with Gibson's idea, Heft also argues that the attributes of the environment are the things that can either facilitate or constrain an individual's actions. In other words, affordance is specific to and derived from an individual's perception.

Focusing on the study of people with late-onset AMD in Scotland, the affordance concept becomes the main organising framework for the research strategy to answer the research questions. For further understanding of the association between preference and emotional restoration, the concept of core affect by Russell

(2003) is used as the co-organising framework in investigating the emotional affordance of the participants.

Both theoretical bases have framed two different fields of enquiry. Each has helped to frame research questions that interrelate with each other. The combination of these questions has led to a mixed method research design strategy. The detail of the framework is shown in Figure 3.3. The research question is presented in the next chapter, where development of the research question and sub-questions will be explained in detail.

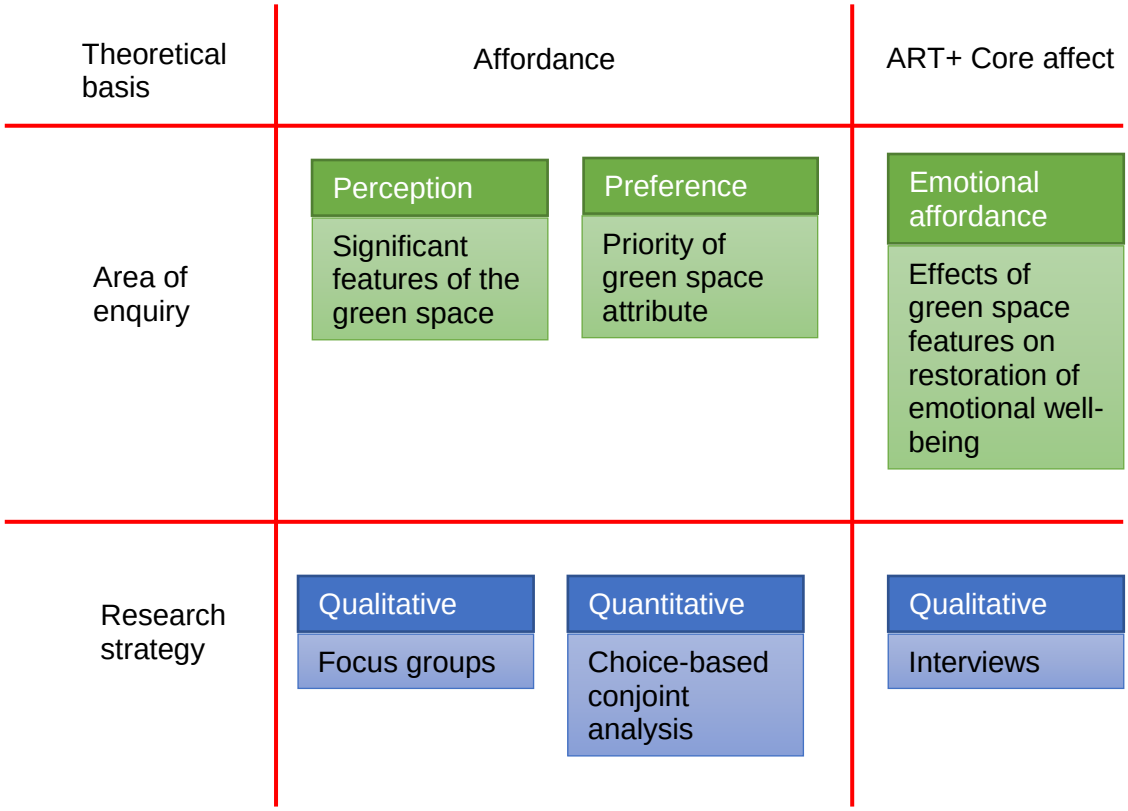


Figure 3.3 Summary of theoretical framework.

Chapter 4: Framing the research question

4.1 Introduction

This chapter presents the justification of the research question and sub-questions that have been derived from the initial research objectives and the knowledge gap identified in the literature review. For example, from the wider perspective of environmental psychology, the presence of green space has been proven to benefit people in terms of their emotional well-being (Herzog et al., 1997; Roe and Aspinall, 2011; Bowler et al., 2010; Schipperijn et al., 2010; Brook, 2010; Ward Thompson, 2013; Mitchell, 2013; Barton and Pretty, 2010; Nutsford et al., 2013). Meanwhile, from the perspective of health and social studies, it is known that people with visual impairment, especially late-onset AMD, tend to suffer from decreased emotional well-being (Marquès-Brocksopp, 2012; Douglas et al., 2007; Kirkcaldy and Barr, 2011; Gosney et al., 2009; Nyman et al., 2010; Orzolek-Kronner, 2013).

Hence, the review of evidence has revealed a gap that needs to be filled in order to consolidate knowledge of the benefits of green space to people's well-being. However, there is no specific evidence relating to how visually impaired people use green space and benefit from it. There is therefore an opportunity to explore how green space can benefit this group, and in particular, people with AMD, by investigating their perceptions of and preferences for green space attributes.

4.2 Initial hypothesis and research question

As discussed in Chapter Three (Theoretical framework), the development of the research question is underpinned by the concept of affordance, as explained by Heft (2003). Heft argues that the environmental attribute can offer potentially different both actions and constraints to different groups of people, including people with various disabilities. An example group is people with late-onset AMD. This group was selected because AMD is the main cause of sight loss in the UK. In addition, certain features in green space have the potential to stimulate people's feeling, as suggested by Russell (2003). However, only particular features have

specific effects in altering people's feeling. This is determined by the individual's perception towards those features. Therefore, it is hypothesised that people's different states of physical and emotional affordance may differ according to the priorities that shape their preferences and the activities in which they engage in the green space. The main research question is:

How do people with late-onset AMD use green space, and does green space play a role in promoting their emotional restoration and quality of life?

By analysing the relative priority of green space attributes set by this group of people, it will be possible to understand their perceptions and preferences from their perspective, viewed as affordances. This therefore provides a platform for understanding how green space can be used to help promote these people's emotional well-being.

4.3 Defining research sub-questions

In order to answer the research question, it is important to investigate and understand the relevant elements that influence the priorities leading to the specific preference of each individual. The literature review along with the theoretical framework gave insight into the notion of how people interact with the environment and derive benefits from it. Underpinned by the concepts of affordance and core affect, the research questions are now divided into three sub-questions, as follows. Each of these then have an associated research method best suited to answering the question.

Research sub-question one: What are the important features of green space to people with late-onset AMD?

This sub-question aims to identify the green space attributes that are defined as the most preferred features of green space by the visually impaired with AMD. The attributes identified will then be used to develop a choice-based conjoint questionnaire as the survey method.

Research sub-question two: What is the relative importance of the green space attributes set by the participants?

This sub-question aims to assess the relative importance of the green space attributes. The relative importance will be assessed through choice-base conjoint analysis to gain an understanding of how certain features are traded off that lead to the relative importance of the green space attributes.

Research sub-question three: Is there any difference in the priority placed on the green space attributes by different subgroups of participants? If so, how do they prioritise them?

This sub-question aims to identify the differing priorities regarding green space attributes between subgroups of visually impaired people, based on variables such as their feelings about sight loss, the duration of their sight loss and the visual condition. This sub-question will also investigate the needs of visually impaired people to visit green space as part of their other leisure activities. The information is significant in gaining an understanding of the green space priorities in a broader context.

Research sub-question four: What are the factors that influence the relative importance of the green space attribute?

This sub-question aims to identify any factor that may influence the relative importance of the green space attributes. The answer to this question will offer better understanding of how people with late-onset AMD use green space.

Research sub-question five: How do participants' preferences for green space provide opportunities for their emotional restoration?

This final sub-question aims to identify the emotional well-being of the participants in relation to their impairment, and its influence on their preference, priority and activities. This information is important to further understanding the relationship between feelings and preferences and the contribution they make to the emotional well-being associated with green space.

4.4 Summary

This research is underpinned by the affordance concept to understand the use of green space by people with late-onset AMD. Evidence from literature across disciplines has been integrated into a focused discussion explaining the gap that needs to be covered in this research. Although a few studies have been conducted in relation to visually impaired people and the environment, these do not explain in detail the relationship between having contact with green space and emotional well-being. People's emotions or feelings can be altered by having stimulation from various sources, as suggested by Russell (2003). Russell argues that nature can be part of this stimulation. Thus, this concept, together with the affordance concept, was used to frame the research questions as defined in this chapter.

The next chapter will explain in detail the process of data gathering and the analytical approach employed in this research.

Chapter 5: Methodological and analytical approach

5.1 Introduction

The literature review has demonstrated the absence of in-depth empirical evidence regarding how people with late-onset AMD interact with green space in terms of their cognitive and haptic processes. Apart from small-scale experiments, there is insufficient evidence to conclude that this group of people can benefit from emotional restoration by having contact with green space. Thus, this chapter will discuss the research methods that are most appropriate when conducting research with a group of visually impaired people. This chapter also describes the objective of each particular method as well as how the methods were implemented.

The closest study that can support this research in terms of the main method is that of Alves et al. (2008), who used conjoint analysis to evaluate older people's preferences in relation to parks. This present research adopts a similar method, a conjoint analysis, which is adapted to the field of landscape architecture. Since the conjoint method has proved to be a very robust method for studying preference, it has been employed by this research as the principal method to study the preferences of visually impaired people for green space attributes, supported by in-depth qualitative research using focus groups and go-along interviews.

Due to the limited information contained within the literature, the research began with a focus group discussion aimed at identifying the significant domains regarding the themes, as presented by people with AMD, that would later be used to generate the conjoint questionnaire. The focus group data were subjected to a process of in-depth analysis to support the quantitative data derived from the questionnaire. Furthermore, the go-along interview method was also used in order to triangulate the results of the conjoint survey.

Initially, the research intended to use 'behaviour mapping'. However, due to the limitation of the sample size and also the fact that some of the participants had health problems and were unable to go the park at the time of the research, this was not an option in this study. This method also proved to be inappropriate because of the vulnerability of the participants. Moreover, for ethical reasons, the participants could not be left alone in a green space and this made behavioural mapping

impossible to achieve with only one researcher being present. This led to the decision to use go-along interviews instead.

5.2 Research design

This is an explanatory study that engages an interpretive social science strategy in order to gain an understanding of how green space affects the emotional well-being of visually impaired people. The strategy for the data collection involved several data gathering methods, such as a focus group, a conjoint questionnaire and go-along interviews. The main method is the conjoint analysis questionnaire and the interviews are used as supplementary supporting methods. The findings from the conjoint survey method were triangulated with the results of the go-along interviews and this was the best technique to validate the results. The go-along interview method is a good way to obtain feedback from visually impaired people whilst in a green space, as the respondents find it more relaxing to talk to the researcher whilst both are engaged in the same activity in the same place (Carpiano, 2009).

The review of literature supported the data collection process as being suitable for answering the research questions. The population of this study are visually impaired people diagnosed with central vision loss due to AMD. The survey employed purposive sampling or theoretical sampling because the research process was a process of discovery, rather than aiming to test a hypothesis (Creswell, 2007). The respondents were 'hand-picked' for this research, as the researcher already had some prior knowledge concerning the specific group of people (Denscombe, 1998). In this situation, the sample population was drawn from a list provided by the Macular Society Support Group in Scotland.

5.3 Research strategy

This research is a cross-sectional study that used a descriptive social survey strategy (Deming and Swaffield, 2011) to gain an understanding of the meaning and context of green space for people with a visual impairment. It employed a mixed methods design, with a quantitative survey as the main data collection technique followed by qualitative go-along interviews and phased by a focus group. The

research has parallel data collection, using Triangulation Design (Creswell, 2007), later known as Convergent Parallel Design (Creswell, 2011) because it often becomes confused with the term triangulation in qualitative research. Regardless of the term used, the notion of this design remains the same.

The mixed methods approach not only provides more comprehensive evidence for studying the research problem, but the combination of several methods will also strengthen the research and offset the weaknesses of each method (Creswell, 2011). The data collection was divided into two independent stages. The first stage was a conjoint survey approach with a focus group discussion as a preliminary data collection method to help frame the survey questions. The second stage was a qualitative approach using go-along interviews. The data gathered were analysed separately and the results merged during the interpretation.

5.4 Challenge in researching the visually impaired

Finding participants is often described by most researchers as the most difficult task in data collection, particularly when dealing with a specific sample. It is never a straightforward process. In this research, finding a gatekeeper of the target population was the first challenge. In the UK, people with macular disease (the majority are people with AMD) have an association called the Macular Society, which is operated by a regional manager for each country within the UK; England, Wales, Scotland and Northern Ireland. The society holds monthly meetings in areas where there is demand for a support group.

After obtaining approval from the Macular Society headquarters in Andover, England, this research project was referred to the Regional Manager in Scotland, based at that particular time in Glasgow. Although permission to approach group members was granted, recruitment of the participants from each support group was still done by the researcher.

As a first step, an invitation letter and project description (see Appendix 2) was sent to the gatekeeper of all support groups in Scotland (a total of 10 groups from Edinburgh, Falkirk, Dundee, Glasgow, Kirkcaldy, Paisley, Lanark, Aberdeen, Inverness and Kilmarnock) explaining the research and the proposal to gather data from the group members. After obtaining permission from the group leaders and

their agreement to cooperate (only from Edinburgh, Falkirk, Kirkcaldy, Glasgow, Dundee and Paisley), the first visit to the group was made during one of their monthly meetings. The purpose of the visit was to meet the group leader in person and also to build up a rapport. At the same time, the meeting also provided an opportunity to further explain the research and to fix a date to meet with the group's members for the first time.

The main challenge in this process was for the researcher to develop competence as a public speaker in the session. This is because one of the functions of the group meeting is for group members to gather and listen to a lecture from a voluntary speaker. The speaker can be from one of a number of different organisations. Although this proved to be a tense session for the researcher, it provided a good opportunity to approach the participants directly in order to collect data. The survey questionnaire was administered in one session as part of an exercise during the lecture. This was the most effective way of communication to get the participants engaged with the survey without making them feel as if they were the subjects of an experiment. This approach was slightly intimidating for the novice researcher, but it was the most effective way of obtaining a good response rate. Nevertheless, not many support group members were interested in participating in this particular research because there were also other organisations and researchers targeting the same population for various other types of research.

5.5 Focus group discussion

The first stage of the data collection was a focus group discussion. This served as a preliminary method of data collection in preparation for the conjoint analysis survey. The purpose of this was to identify the attributes that would later be used to construct the choice-based conjoint (CBC) questionnaire. This method was required due to the limited information in the literature about how people with AMD perceive the features of green space.

According to Krueger (1994) and Morgan (1997), as cited in Onwuegbuzie et al. (2009), three to six is an adequate number of focus groups to reach a point of data saturation or theoretical saturation. The number of participants in each group should be approximately six to eight for a hard-to-reach population (Krueger and Casey,

2001). The population of people with late-onset AMD was considered a hard-to-reach population because of the small number of people with the condition and their limited outdoor mobility as a result of their visual difficulties.

5.5.1 Objective of the focus groups

The purpose of the focus groups was to gain an insight into the views of AMD sufferers regarding green space attributes, their preferred activities, the difference in experience before and after being visually impaired and also their general feelings about their impairment. Following the study on older people's preferences for open spaces by Aspinall et al. (2010), the list of environmental attributes identified in that study was employed as a basis for the focus group discussion, because the target participants in that study were very similar in age. There are also other studies about the quality and attributes of green space (Layne, 2009; Gidlow et al., 2012; Hussein, 2012) that were also used as the basis of enquiry to guide discussion in the focus groups. The objective of the focus groups was to identify and produce a list of features of green space that are important to the participants. These features would later be used in development of the CBC questionnaire.

5.5.2 Design of the focus groups

Most of the focus groups were conducted in a piggyback session, meaning that the session was conducted during the monthly meeting time. This was the most convenient approach for the participants and also the researcher, because the focus groups were conducted as activities additional to the monthly Macular Society Support Group meetings. The sessions were conducted before the meeting and the recruitment of participants was conducted by the group leader on a voluntary basis. There was also a session where the participants came to the monthly meeting but the session comprised only the focus group discussion, instead of the normal lecture session.

A total of seven focus groups with 42 participants were conducted; 19 participants (three groups) from various places in Edinburgh and 23 participants

(four groups) from Falkirk. The participants had different profiles according to age, gender, current sight condition and duration of their sight loss. All of them had been visiting green spaces for various reasons.

5.5.2.1 Structure of questions

The discussion began with a question that encouraged the participants to share their experiences. It was as simple as asking them about the park they had most recently visited and the purpose of their visit. When the participants started to engage in the discussion, further questions were asked to obtain more insight into their experience in the park, about the activities they did during the visit and also about the features of that place that they particularly preferred. They were also asked to share any unpleasant experiences. The questions were open-ended and participants were free to express any feelings about their experience of the visit (see Appendix 3). Due to the purpose of this discussion, the background of the participants was not asked about in detail apart from the condition of their sight and the length of time they had had AMD. Since this was the initial stage of the data collection, no personal questions were asked about their feelings on their sight loss to avoid them feeling intimidated by that question.

5.5.2.2 Sampling strategy

This method adopted purposeful sampling or theoretical sampling from the population of people with late-onset AMD across Scotland. Only one out of the seven groups was a mixed group. The discussion was conducted at an RNIB support group meeting where the participants were people with various types of visual impairment, all of whom had been referred by an ophthalmologist at the Alexandra Eye Pavilion Hospital, Edinburgh. The group consisted of 12 people, six of whom had AMD. This was a challenging situation because the participants with other types of eye disease were a lot younger and they had different opinions regarding the discussion topic compared to the older participants. This was anticipated, however, because the younger people and also those with a different visual condition had different affordance than the elderly with central vision loss.

5.5.2.3 Pilot testing

Pilot testing for the focus groups was conducted prior to the data collection. The aim of this pilot testing was to get the whole picture with regard to how best to conduct a discussion with people with a visual impairment and who are also elderly. The pilot testing was important because the participants were considered vulnerable and there was thus concern about the possibility of participants being offended by the questions. The role of the pilot testing was therefore to test the possibility of offending the participants, which may have led to their refusal to take part in the discussion (Bowden et al., 2002). It was also the best way to engage with the participants during the session.

During the pilot testing, it became clear that having a group of 10 people or more was not appropriate for this research. This was due to many factors that were identified during the session. First, the researcher, a non-native English speaker, had some difficulty in understanding the Scottish accent. Therefore, extra attention had to be paid in order to understand the content of the discussion. The participants equally had difficulty with the researcher's accent. Most of the time, the question had to be repeated several times, with the participants also doing the same, particularly when mentioning certain unfamiliar words. The major discovery through pilot testing was the fact that most of the participants also had hearing difficulties, but having central vision loss makes lip-reading almost impossible. The combination of sight and hearing impairments made the situation worse. The researcher had to project her voice clearly without sounding like she was shouting. This proved particularly difficult with the discussion being conducted in a piggyback setting.

As a result, the discussion progressed very slowly and not much data were gathered. Therefore, it was necessary to reduce the size of the group size to a mini focus group of four to five people, as suggested by Krueger (2009). In this setting, all of the group members could sit close together and better listen to the conversation. Furthermore, this was more suitable for the piggyback session, which was the setting for most of the focus group discussions. Due to the difficulty in the recruitment process, some useful information were included in the main data gathering analysis.

5.5.2.4 Procedure and participants

The focus group discussions began in October 2013. During the meetings with the group leaders, a detailed explanation of the research and data collection procedures was given. Then, the group leaders found an empty slot in the monthly meetings so that the data collection could be carried out. The advantage of the piggyback session was that the data collection could be done in any month when there was a meeting, provided prior notice was given. As result, the group leader was already aware of the procedure and helped to set up the group discussions prior to the monthly meetings. Information sheets and consent forms were distributed to the participants by the group leader prior to the start of each session (see Appendices 4 and 5).

The number of participants varied and it was impossible to achieve a gender balance in the groups because there were generally more female than male members. The researcher played the role of an outsider in the discussions. However, her presence was acknowledged by the group members because the researcher had already joined their meetings a few times prior to the start of the data collection. This was just to familiarise the participants with the researcher. As a result, it made them feel more comfortable participating in the discussions.

During the discussions, the participants were addressed using their names, but at the same time, they were assured that their confidentiality and anonymity was guaranteed throughout the research and also in any subsequent publications. Doing this ensured that the session had a more relaxed and less intimidating atmosphere. Furthermore, the fact that the participants already knew each other was an advantage because they were able to have a continuous discussion without much interruption from the researcher, who acted as moderator. The discussion was recorded with the participants' consent for data analysis purposes. The participants' characteristics are shown in Table 5.1.

5.5.3 Method of analysis

The data analysis in this method serves two purposes. First, to identify the features of green space that are important to the study participants and which could

later be used in developing the questionnaire, and, second, to understand how they use

Characteristic		N (%)
Gender		
	Male	15 (36%)
	Female	27 (64%)
Age		
	Below 80	29 (69%)
	Above 80	13 (31%)
Current state of sight		
	Fair to moderate	25 (60%)
	Severe sight	17 (40%)
Duration of sight loss		
	1-3 years	5 (12%)
	4-10 years	20 (48%)
	11 years and above	17 (40%)

Table 5.1 Participant profiles for focus groups.

the green space in daily life. It was considered that this stage had a narrow purpose and therefore an elaborate analysis was not needed (Krueger, 2009). The method of analysis used was abridged transcripts, which means that the transcription relied on listening to an audio recording of each focus group and capturing only relevant data. This process was slightly less time-consuming than transcribing the data in full. The transcription process was carried out manually using paper and pen because this made it easier to engage with the whole idea of the discussion and at the same time the context of the participants. In order to identify the significant attributes from the data, the transcripts and field notes were analysed using the distribution of keyword (frequency) method (Saldaña, 2012). The data were also analysed using thematic analysis.

5.5.4 Challenges in this method

Throughout the focus group process, there were several challenges that are worth mentioning. The first was the visual and hearing limitation of the participants. Having these difficulties made it necessary for them to pay more attention to the discussion and, consequently, they became more easily fatigued in longer sessions. The second challenge was the piggyback session. Since everybody knew each other and the only time they met was during the monthly meeting, there was a great

tendency for them to engage in general chat rather than to focus on the subject of the discussion. To overcome this situation, the researcher had to be more creative in throwing out ideas that encouraged them to discuss things that generated data for the research. Nevertheless, this was also an advantage because most of the participants already felt comfortable talking to each other, which made it a more relaxed environment.

5.6 Choice-based Conjoint (CBC) survey

5.6.1 Selection of conjoint method

Conjoint analysis is known to be an accurate tool for measuring insights; it is able to predict respondents' behaviour more than most other research models. 'A conjoint survey respondent cannot simply say that all features are important. They must trade off different aspects of the product (as in real life), weighing alternatives that have both highly desirable and less desirable qualities' (Orme, 2013, p.3).

Conjoint Analysis (CA) originates from market research. It was developed based on worked carried out in 1964 by mathematical psychologist and statistician, Luce and Tukey (cited from Orme (2013). Later, in 1974, McFadder developed the work into the discrete choice method known as CA. Conjoint means 'considered jointly'. A key characteristic of CA used in market research is that the respondents have to evaluate product profiles composed of multiple features. Marketing professor Paul Green noticed the potential of CA in reaching an understanding of how buyers make purchasing decisions and also to estimate preferences for products. Also, at the same time, practitioner Richard Johnson invented the full-profile pairwise trade-off method. However, CA began to gain popularity in the early 1980s following the publication of a paper about its use in industry by Paul Green and Seenu Srivinasan in the Journal of Consumer Research in 1978.

There are five different types of CA from which to choose, based on their suitability to the research context. These are: traditional full-profile conjoint or conjoint value analysis (CVA), choice-based conjoint (CBC), adaptive conjoint analysis (ACA), adaptive choice-based conjoint (ACBC) and menu-based conjoint (MBC) (Orme, 2013).

CVA is also known as traditional full-profile conjoint. It is a rating-based system and has rarely been used in research due to a lack of robustness. Therefore, it was excluded from the method selection. In addition to CVA, MBC was also excluded from the method selection because of the complexity of its design, programming and analytical process. Hence, it is not suitable for the beginner to use except under close supervision from an experienced consultant (Orme, 2013). The two adaptive conjoint methods (ACA and ACBC) are methods in which the attribute levels are initially filtered according to respondents' answers to the final questionnaire. This process is time-consuming, and moreover, needs to be computerised. Since the data collection was to take place in the support group meeting, and respondents were unable to use a computer, it was not feasible as a method. As a result, only CBC proved to be an appropriate method for use in the study because it can be administered using paper and pencil.

This research employed a paired-comparison task in the questionnaire, because this is the simplest format for a CBC design and, following the practice of the research with older people (Aspinall et al., 2010), seemed most appropriate. Conjoint is the best method for a preference study because it differs from the conventional preference questionnaire or rating task that is normally constrained to an individual option in isolation. Conjoint provides alternatives for trade-offs between options.

Although conjoint surveys are nowadays generally web-based, CBC can be administered using a paper-based questionnaire. This was a great advantage because the participants in this study were mostly elderly, most probably lacked computer literacy and all had vision problems, meaning they would have found using a computer difficult. As it was, some of the participants who had severe visual impairments required assistance in completing the questionnaire. Furthermore, the survey was conducted within the support group meeting so the data collection procedure could be closely supervised by the researcher in order to gain a higher response rate.

The next section explains the CBC method employed in this research in more detail.

5.6.1.1 Terminology and definition

Several basic terms are used in relation to CA. Basically, a conjoint questionnaire is a set of questions with alternatives or choices, from which the respondent chooses their preferred option. The question is called a 'task', and it represents the set of alternatives from which the respondent can choose. The task may consist of two or more alternatives but the respondent has to choose only one of these.

The alternatives are called 'concepts'; they consist of situations with various features built into them. The features are called the 'levels' of the attribute. The levels can be qualitative or quantitative. Each concept has a different combination of levels. Meanwhile, the whole set of tasks is called the questionnaire version. (See figure 5.1)

5.6.2 Objective of the method

CA was chosen for this research because of its validity and reliability in assessing the relative importance of the different attributes. In contrast with the conventional question format approach to studying preference, such as the Likert scale, top-box scoring and constant sum, CA offers greater validity and reliability by creating a hypothetical product or situation and it can generate a relative importance score for all of the attributes (Bhaskaran, 2007). The objective of this method was to assess the relative importance of park attributes that were identified from the findings of the focus group discussions in the preliminary stage of the data collection.

5.6.3 Design of the CBC questionnaire

Paired CBC was chosen for this research; it is much easier for respondents to choose from two alternatives rather than having too many. This was also chosen to avoid the respondents feeling tired as a result of having to memorise the available options in the task.

Another reason for using a paired CBC was that the recommended number of tasks needed to obtain a stable estimate using the CBC method is 12. However, the number of tasks in this survey had to be increased to reach an acceptable design

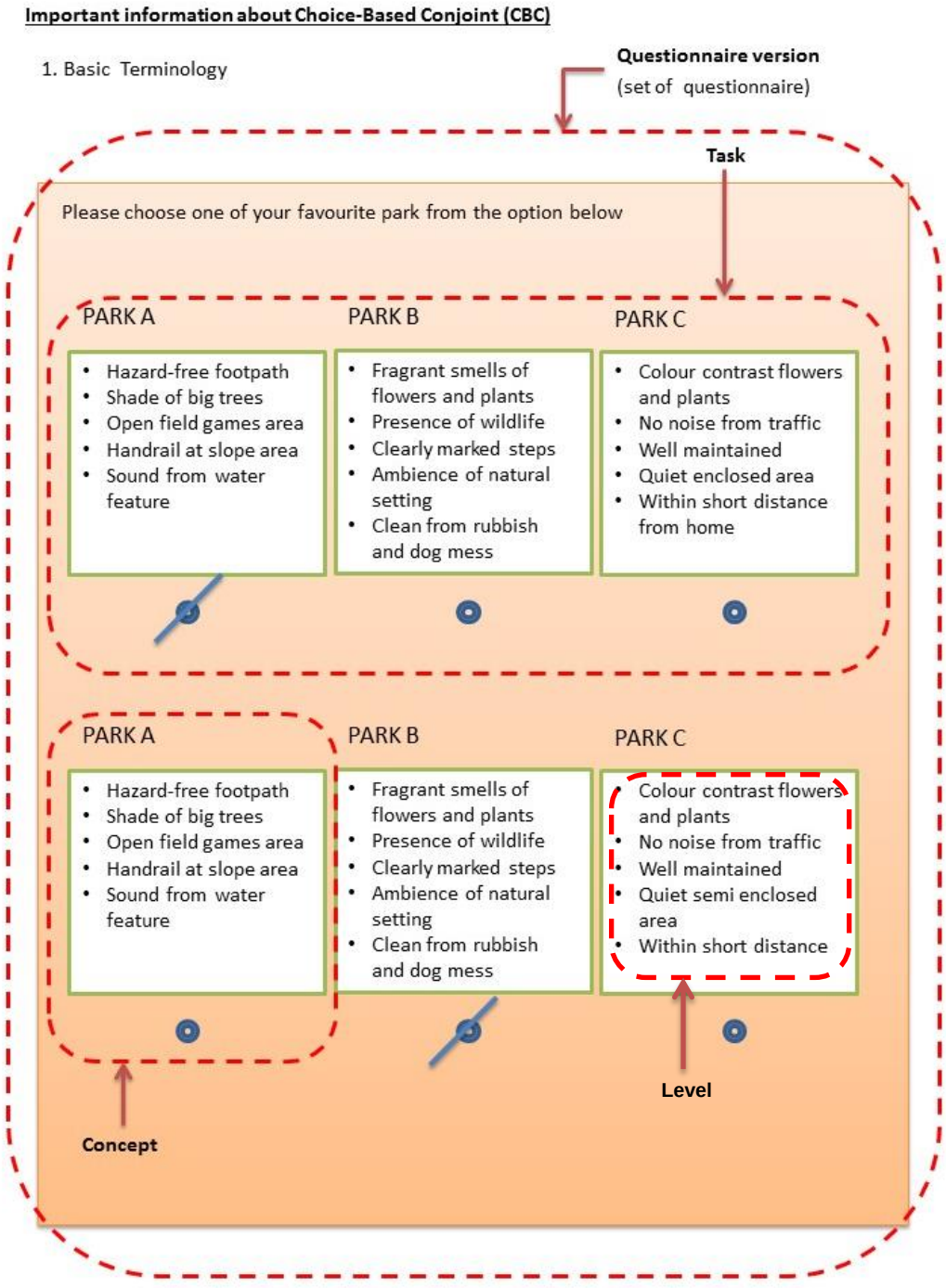


Figure 5.1 Basic terminology in a conjoint questionnaire.

efficiency value because the sample size was below 100. The questionnaire was developed from the attributes and levels identified from the focus group findings. There were four attributes with four levels in each attribute.

The attribute is the characteristic of the product or in this case, of the park design domain. It is also sometimes called the factor. Meanwhile, the levels are the degree of the characteristics; these can be quantitative or qualitative. In this research, the levels were the description of the park features that matter to people with central vision loss as identified from the focus group discussions. This was represented in the task as a short but clear description which provided just the right amount of information for the respondents to understand the questions and make their decision. The levels can also be presented using a picture, but a picture was not suitable in this context because it would have had to be very large for the respondents to see it clearly. Furthermore, a text profile of park features allowed greater flexibility in generalisation so that the participants could relate the information provided to their local park (Ward Thompson et al., 2010).

In order to help the respondents engage with the task and make it possible for them to trade off certain situations, a hypothetical park was set up. The respondents were asked to assume that this was the only park they could visit frequently, and to choose the version that was most ideal for them to visit. To increase the validity and reliability of the data, the CBC questionnaire used a randomised design, which was more suitable for a paper-based questionnaire. This meant that each respondent received a different version of the questionnaire.

In a paired CBC, the stimuli or the task can be full or partial profile. Full profile means that all attributes appear in one task, while in partial profile only some of the attributes appear in one task. This research employed full profile because partial profile has many weaknesses. This is because decision-making is considered with less or partial information and a larger sample size is therefore required to stabilise the result (Bradlow, 2005; Charzan and Orme, 2000; Orme, 2013). A partial profile design is also prone to bias because respondents can ignore omitted attributes and make decisions solely on the basis of the partial information presented (Orme, 2009).

The questionnaire was automatically designed using Sawtooth Software conjoint software by Sawtooth Software, Inc., based in Utah, United States. The input needed was the attributes and the levels for each attribute. The completed questionnaire was later copied onto paper and printed out in a large font for ease of reading.

5.6.3.1 Selection of attribute and attribute level

From the focus group findings, 20 park features emerged that mattered to the participants. These features were later classified into five attributes, each with four levels. Those attributes were: physical, social, accessibility, sensory and environmental. The attribute 'environmental' was used to classify levels such as hazards on a footpath, dog mess, the presence of rubbish and youngsters hanging about. It was the only attribute that was represented by negative features and therefore the appearance of any of these levels in the concept of the task would definitely affect the judgement of the participant. It gave an unstable estimate of the relative importance because the participants definitely tended to focus only on the negative levels and ignore the other levels in the concept.

This assumption is supported by previous evidence from a preference study of older people in a neighbourhood park (Alves et al., 2008). The finding demonstrates that the attribute 'nuisance' was the most important attribute of the green space that determined their preference. Referring to this evidence, adding the negative levels into the CBC questionnaire would result in a higher utility loading or part-worth and could have caused an unjustified estimate of its relative importance to the purpose of this research. Therefore, the environmental attribute was eliminated during development of the questionnaire, leaving only four remaining attributes.

5.6.3.2 Questionnaire construction

The questionnaire was fully developed using conjoint software, with Sawtooth Software version 8.3.6 used throughout the process. The identified attributes and levels were entered manually into the dialog box in the programme and

the researcher determined the design strategy that best suited the data collection objectives.

The best design of the questionnaire was a randomised strategy. This strategy reduces bias, which can occur when respondents start to memorise the sequence of attributes that appear in the task. There are two options for producing a random design. One is complete enumeration and the other is the shortcut method. Recent software developments recommend setting the default as complete enumeration because the questionnaire produced using this option is the most neatly orthogonal design for each version. The quality of a questionnaire produced using complete enumeration is much higher than that of one produced using the shortcut method.

Although the number of recommended tasks for one version of the CBC questionnaire should not be more than 12 to avoid too much of a burden on the respondent, the design efficiency of the questionnaire should not be compromised, being not less than 95% for a stable estimate. Therefore, to achieve this level of efficiency, there were 10 versions of the questionnaire produced with 20 paired-choice tasks in each version. All four attributes appeared in every concept. In order to ensure that the designed questionnaire would permit a stable estimation and have higher reliability, an advance test was performed to make sure that the questionnaire was optimally efficient. Its clarity was confirmed through the test. Due to the limited population of people with central vision loss, the validity of the data was also ensured by calculating the acceptable proportion of the population needed for a reliable result.

5.6.3.3 Structure of questions

Apart from asking about preferences for green space attributes, the questionnaire also contained a few other sections. The first section asked about respondents' preferred leisure activities. The purpose of this section was to assess respondents' general preferences for leisure activities. This information would help to understand, from a broader perspective, how the respondents prioritised green space compared to other leisure activities in their daily lives.

During the composition of the questionnaire, there was limited empirical evidence to link people with central vision loss and leisure activities. Therefore, the

best evidence was used to support the development of this section of the questionnaire. One research study on the elderly and leisure classified leisure activities into four categories: physical, recreational, social and intellectual (Leung et al., 2011). This section was measured using a Likert-type scale which presented six types of leisure activities. The respondents were asked to rank their preferred activities using the scale (from 1 for least preferred to 6 for most preferred).

The idea of asking about preferred leisure activities at the beginning of the questionnaire was to familiarise the respondents with the print and lettering used in the questions and put them at ease, giving them an easy task that would get them engaged with the survey.

This section was followed by a section asking about their feelings towards sight loss. This section used a Likert scale to measure the feelings of frustration, anger, sadness and anxiety, as suggested by a counsellor who works closely with people with AMD (Southwell, 2012), based on the most reported feelings. Each had a three-point scale and this scale showed a good internal consistency, with a Cronbach's alpha coefficient of 0.7, as suggested by Pallant (2013). The respondents were asked to rate their own feelings towards their current visual condition. Referring to the meaning of well-being, Kahneman et al. (1999) suggest that well-being is best described by the individual themselves (see Chapter Two, section 2.3.2).

This information was very important in order to understand respondents' emotional state and was later used to find out about the association between their feelings and their preferences. According to Russell (2003), the emotions or feelings of an individual are affected by their physical condition and, hence, the preferences were hypothesised to be different from one to another, depending on their feelings.

The main body of the questionnaire comprised the paired CBC task. The respondents were presented with two choices for a hypothetical park, from which they had to choose one as their favourite by assessing the attribute levels in each choice. This part proved a little overwhelming at the outset because too many tasks were presented compared to the recommended number, but was unavoidable because of the need for design efficiency. The other factor that contributed to the lengthy task was the paired choice itself. The number of tasks can be reduced to the recommended

number provided that the number of concepts is increased to more than two choices. The more concepts per task, the shorter the task will be. However, due to the respondents' visual limitations, which caused them difficulty in reading (some found it impossible), the paired choice was the best because the respondents were required to compare only two options. Even comparing two seemed to be a struggle for those respondents with severe eyesight problems.

The demographic questions comprised the last part of the questionnaire because this was the easiest task to complete, although some of the respondents may have found it intimidating. These questions were placed at the end because after completing the lengthy task, the demographic section would be the rewarding part. For this part, all answers were made categorical for ease of answering and marking because almost all of the respondents had difficulty in writing.

5.6.3.4 Sampling strategy

This research used purposeful sampling with a homogenous sample. The participants were recruited through Macular Society support groups from across Scotland. A letter of intention was sent to each group leader asking permission to recruit group members as participants and also offering a free lecture about park design as one of the slots in their meeting. Five groups agreed to participate and the group leader offered available dates for the execution of the questionnaire. A total of 50 respondents completed the survey.

Although it has been suggested that a sample size of more than 100 is necessary when using the CBC method, the minimum sample size is not calculated solely by the number of respondents, as in a conventional survey. It also incorporates the number of tasks in the survey, the number of concepts per task and the number of maximum levels. Therefore, having 50 respondents was acceptable to achieve a stable estimate using this method (see Appendix 6).

5.6.3.5 Pilot testing

The advantage of using CA was that the software was accompanied by an advance test module. The test module serves the same purpose as pilot testing in a

conventional survey. It aims to ensure that every questionnaire design has acceptable efficiency in order to obtain a stable estimate of the relative importance of the different attributes. Therefore, pilot testing for this method was executed mainly to obtain the average time taken for the respondents to complete the questionnaire. It was also performed to identify the descriptions in the levels that may cause confusion among the respondents. The average time taken to finish the questionnaire was 10 minutes for respondents with fair eyesight and 30–45 minutes for respondents with moderate and severe eyesight problems. The data gathered during pilot testing were included in the main data during analysis.

5.6.3.6 Procedure and participants

The data collection was carried out in the form of a course, in which the researcher posed as a speaker during the session. After a brief description of the speaker's background, the participants were presented with some information about green space design in Malaysia and were also encouraged to ask questions during the presentation. This strategy was used to get them engaged with the session. As a conclusion to the presentation, the participants were asked to express their opinion about their favourite green space characteristics through the questionnaire booklet given to them. The participants could opt to withdraw from the exercise if they were not willing to participate, with no consequences. Nonetheless, almost all of the group members were happy to participate because they saw this as an exercise rather than strictly filling in a survey. The researcher also acted as a facilitator to help those respondents who had difficulty in reading and understanding the task.

The questionnaire was laid out in large print and bound in the form of an individually numbered booklet with a plastic cover over each sheet. To account for their visual limitations, each respondent was given a broad tip marker pen to mark their answers in the booklet. At the start, the respondents were given a scenario in which they had to choose the park that best suited their preferences from two options. To avoid any confusion between the tasks, only one task was printed on each page.

The participants were encouraged to bring their low vision aids to the session to help them read the questions. For most of them, the font size of 40 point was the most appropriate for reading (see Appendix 7). However, the average time taken to finish answering the whole booklet was between 30 and 45 minutes.

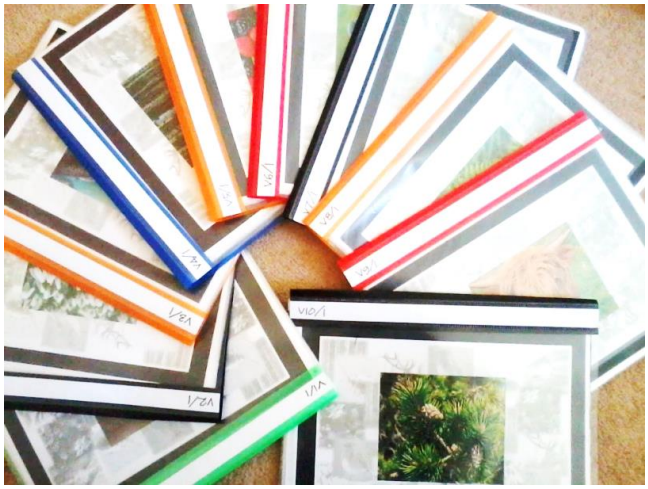


Figure 5.2 The questionnaire booklet with version number.

Overall, there were 17 male (34%) and 33 female (66%) respondents, most of whom were elderly. A total of 23 (46%) respondents were aged below 80 and another 27 (54%) were aged 80 and above, as shown in Table 5.2. Half of them reported having fair to moderate eyesight while the other half reported having severe sight loss.

Characteristic		**N (%)**
Gender		
	Male	17 (64%)
	Female	33 (66%)
Age		
	Below 80	23 (46%)
	Above 80	27 (54%)
Current sight condition		
	Fair to moderate sight	25 (50%)
	Severe sight	25 (50%)
Duration of sight loss		
	1-3 years	8 (16%)
	4-10 years	28 (56%)
	11 years and above	14 (28%)
Other difficulty		
	Hearing and other physical difficulties	22 (42%)
	No other difficulty	29 (58%)
Living arrangement		
	Live alone	33 (64%)
	Live with other people	17 (34%)

Table 5.2 Participants' profiles for choice-based conjoint survey.

5.6.4 Method of analysis

The relative importance of the attributes was determined from the part-worth or utility value of each level. The calculation was performed using average utilities provided by the Sawtooth Software used to generate the questionnaire. The Hierarchical Bayesian (HB) method is an estimation method in the analysis process. The HB method of analysis was considered an advanced module of analysis because it produces a more stable and accurate individual part-worth or utility value (Orme, 2013). This reason also justified why determining the attributes from the focus groups was vital because any unrelated attribute and level might give an unjustified result.

Apart from the CA, the correlation between relative importance and other variables was also explored. The non-parametric Mann-Whitney U and Kruskal-Wallis tests were performed in order to investigate the differences in the relative importance of the different attributes to the various subgroups. Where a statistically significant difference was identified, a post hoc comparison was performed. This test was carried out to identify the variables that caused the differences in the relative importance of the attributes.

For further understanding of the relationship between dependant and independent variables, the SPSS test of correlation (Spearman rho) and answer tree were performed. Any significant association found in these test were interpreted in the triangulation between the findings of the interview and the survey.

5.6.4.1 Utility value or part-worth

Utility value or part-worth is the value assigned to each level in the attributes. The value was randomly assigned by the computer in the questionnaire design process. The utility value is scaled to a zero-centred mean, therefore, some levels have positive values and some have negative values. These values did not determine the level of attractiveness of the attribute levels. However, the value is used to determine the average importance of the attributes and the values assigned to the levels may suggest the level of importance of the features in the decision-making

process by the respondents. The application of the utility value will be explained in Chapter Six (Section 6.3.2).

5.6.5 Challenges of this method

Apart from difficulty in reading, the most challenging aspect of this exercise was the large number of tasks, particularly for those people with severe sight impairment. They became fatigued due to having to focus on reading and remembering the combinations in each concept at the same time. As result, the response was slow and very time-consuming. Even though they used low vision aids, this did not seem to help them much with their reading. The cause of the problem was perhaps due to certain factors that are worthy of further study in a related field.

5.7 Semi-structured interviews

5.7.1 Objective of the method

The final phase of the data collection employed semi-structured interviews, which were conducted using two different methods. These aimed to understand the priorities of people with late-onset AMD with regard to green space attributes in the neighbourhood park that emerged from the conjoint. They also aimed to understand how these priorities were associated with the restoration of people's emotional well-being when coming into contact with green space.

A qualitative approach was chosen because the data were based on the emotions, experiences and feelings of the participants. These types of data need to be explored in depth rather than simply being reported in a word or two (Denscombe, 1998). Although the interviews were conducted using open-ended questions, they were still bound to a clear checklist of questions. However, the respondents could elaborate on points of interest to any extent they wanted to.

5.7.2 Design of the interview

The interviews were part of the qualitative strategy of a descriptive social survey (Deming and Swaffield, 2011). For this particular research, the interviews were conducted using two methods, walk-along and home interviews. The walk-along interviews were conducted in a green space chosen by the participants because of their familiarity with and the frequency of visits to it. The term 'walk-along' is used because the interviews were conducted while walking with the participant. This is a type of 'go-along' method, which comprise a number of ways of administering interviews, such as 'ride-along' (Carpiano, 2009).

The strength of this method is that through walking and asking questions, the researcher was able to observe as well as examine the participant's experience and interpretation within the visited environment. The method also opened up the participant's senses to allow them to recall incidents and feelings that constituted their own understanding of their life world (Anderson, 2004).

Another method used was home interviews. These were conducted at the participants' homes because their physical and health conditions did not allow them to go outside for extended periods of time.

5.7.2.1 Structure of questions

Although the interviews were conducted using two different methods, the questions were based on the same major area of inquiry. At the beginning of the session, the participants were asked about their visual condition and how they felt about it. These questions aimed to capture a general understanding of the emotional state of the participants. Next, they were asked about their most recent visit to a park and the activities they took part in whilst at that park. Participants were also asked about the frequency of their visits to the park. This question led them indirectly to elaborate on their preferences with regard to the features of the park that had an influence on the activities they engaged in whilst there. They were also asked about undesirable things in that particular park. Subsequently, they were also asked about their feelings when in contact with the green space.

5.7.2.2 Sampling strategy

This method adopted a purposeful sampling strategy drawn from the same members of the Macular Society Support Group across Scotland as for the focus groups and conjoint survey. For qualitative methods, there is no specific sample size stated for the study. Nonetheless, the rule of thumb to achieve a 'gold standard' of data is data saturation (Tashakkori and Teddlie, 2010). This is the point at which extra data do not provide any new information. Data saturation normally occurs within 12 interviews, provided that a homogenous sample is selected.

The participants in the interviews were recruited during the survey session and also during the support group meeting. The total number of participants who agreed to participate was 13. Five of these volunteered for a walk-along interview while a further eight participants were more comfortable being interviewed at home, due to their physical and health conditions. The data gathered during pilot testing were included in the main data.

5.7.2.3 Pilot testing

This method was tested to find out if there were any flaws or limitations within the questions. Through the pilot testing, it was identified that the time taken for a home interview was much longer than for the walk-along interview. It took up to 120 minutes and the questions needed to be asked directly in order to obtain the relevant data. Respondents tended to express their feelings in general rather than focus on their specific feelings in relation to the green space. Therefore, the researcher had to ask the questions clearly and also at the same time try to keep the participant focused on the interview topic.

In contrast, there were few weaknesses found in the walk-along interview. The park automatically became the focus and fewer questions needed to be asked, unless some of the data sought were not mentioned by the respondent. The only concern was the fitness of the respondents during the walk, because most of them were elderly. However, the pilot testing identified that fitness was not a problem for these participants.

5.7.2.4 Procedure and participants

The interviews were conducted in the late spring and summer because these were the most suitable times for outdoor activities in the park. The invited participants were given the letter of invitation along with a consent form. In the consent form, the participants were able to choose the method of interview that best suited them. For the walk-along interviews, the participants were asked to choose their preferred park for the excursion.

On the day of the interview, the researcher went to the meeting place selected by the participant, and from that point, the researcher and participant walked together to the chosen park. The questions were asked while walking, and sometimes while sitting on a bench for a rest. For the home interviews, the researcher went to the participant's house on the agreed date and time. Both types of interview lasted between 60 and 120 minutes. The interviews were recorded with the permission of the respondents.

Five participants agreed to participate in the walk-along interview. Four of them had fair to moderate eyesight, which meant that they were able to read well with or without visual aids. Only one had a severe sight impairment, which meant that they could not see and could not read at all. This participant used a guide dog to help her navigate in the outdoor environment. Although this participant was considered blind, she still visited the park on a daily basis to relax and walk her dog.

In the home interviews, all participants had fair to moderate eyesight, which meant that they could read well with or without visual aids. However, their health condition did not permit them to move a lot in the outdoor environment. One of them suffered from chronic asthma. She could not stay outdoors for long, especially during spring and summer time, which was when the interviews were conducted. Three of the participants had not actively engaged with the outdoor environment since they were younger, and therefore preferred to be interviewed at home. Moreover, they were not fit enough to move around outside because of their age. One of them was 99 years old. The rest of the participants had major or health conditions such as heart disease, a broken bone and even cancer (see Table 5.3).

5.7.3 Method of analysis

Thematic analysis was employed for the analytical method. This is a method for identifying, analysing and reporting themes within the data. This analytical method is an essentialist and realist method because it reports experiences, meaning and the reality of participants (Braun and Clarke, 2006).

The recorded interviews were manually transcribed using paper and pen. This approach engages the researcher with the whole idea of the discussion and the real situation that happens during the interview process. The coding process was also conducted manually. Two cycles of coding were employed in the analysis process. The first cycle of descriptive coding was performed throughout the data. The second cycle employed pattern coding. The purpose of pattern coding was to group similar patterns of coding into new codes which can represent all coding (Saldaña, 2012). The final coding divided the data into several categories and emerging themes were identified through those categories.

Code of participants	Gender	Age	Visual condition	Health condition	Interview method
R1	F	>90	Moderate	Heart condition	Home
R2	M	>90	Fair	Healthy	Home
R3	F	>80	Moderate	Healthy	Walk-along
R4	F	>90	Moderate	Heart and cancer	Home
R5	F	>80	Moderate	Back pain	Home
R6	F	>80	Severe	Healthy	Walk-along
R7	M	>50	Fair	Healthy	Walk-along
R8	M	>80	Moderate	Knee problem	Walk-along
R9	F	>80	Fair	Healthy	Walk-along
R10	M	>80	Moderate	Knee problem	Home
R11	F	>80	Fair	Back pain	Home
R12	F	>80	Fair	Asthma	Home
R13	F	>90	Fair	Healthy	Home

Degree of visual condition; Fair: able to read well without visual aids, Moderate: able to read well with visual aids, Severe: not able to read at all even with visual aids.

Table 5.3 Participants' profiles for interviews.

5.7.4 Challenges in this method

The walk-along interview method was at first anticipated to be the most challenging because it takes place in the outdoor environment, with some participants having physical difficulties. However, it proved to not be as difficult as

anticipated. All those who volunteered were fit enough to walk in the park for quite a long period. Nevertheless, they still had to stop and sit quite often for a break, because talking whilst walking seemed to make them easily tired and breathless. The challenge was when there was not enough seating available in the park and the participant had to walk for a long distance to find a seat. This point is worth mentioning, because when dealing with vulnerable participants, their health and safety must be taken seriously. Another challenge was the emotional vulnerability of the participants. The researcher had to be careful not to ask about sensitive issues that might hurt their feelings or make them feel intimidated by the questions. This case is more specific to a participant who had recently been diagnosed with AMD.

5.8 Triangulation strategy

5.8.1 Objective of triangulation

This research employed a mixed method design with parallel data analysis, which meant that the data collection and analysis of each phase were carried out separately. The findings were not compared or consolidated until the discussion stage. The most common approach for comparing results in this design is triangulation. This approach aimed to facilitate integration of the conjoint survey and the interview findings. The integration was done in the interpretation stage and this process helped to clarify the theoretical proposition and the results. Triangulation also aimed to determine whether or not the findings from each method supported each other. The strength of the design is in mutually validating and confirming the conjoint survey results and the interview findings. Thus, the interpretation will end up with valid and well-substantiated conclusions.

The process of triangulation begins by comparing the results of conjoint analysis and the findings from the interviews. This step was performed to justify the priority being set by the participants. Next, in order to further understand how preference influences the restorative process, the findings from the qualitative interviews were cross-checked with the qualitative findings obtained from the focus groups. The focus group findings may also provide further justification for the conjoint analysis results.

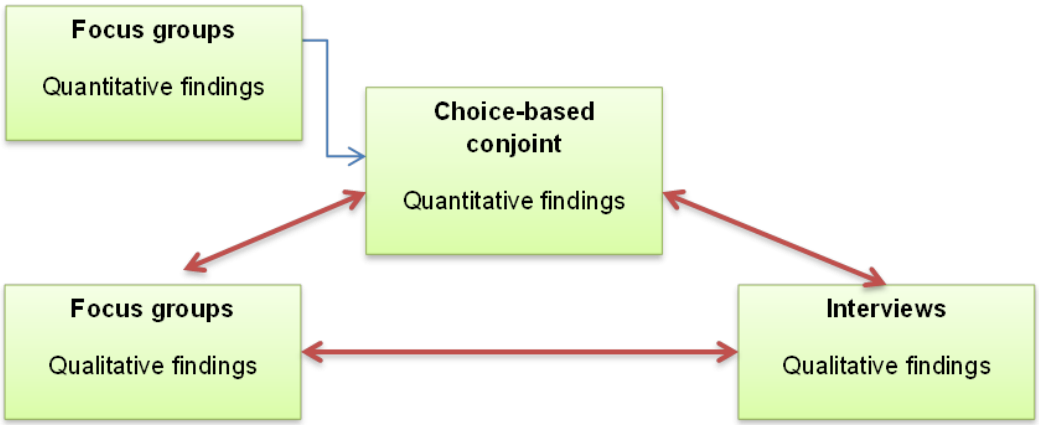


Figure 5.3 Triangulation process

5.8.2 Methodological metaphor of triangulation

Combining the findings of both the conjoint survey and the interviews can facilitate an improved understanding of particular phenomena (Bowden et al., 2002). This research adopted the triangulation convergent design in which both findings were expected to lead to the same conclusion. According to Bryman (2012), triangulation can increase validity by enabling the results from each separate method to be cross-checked.

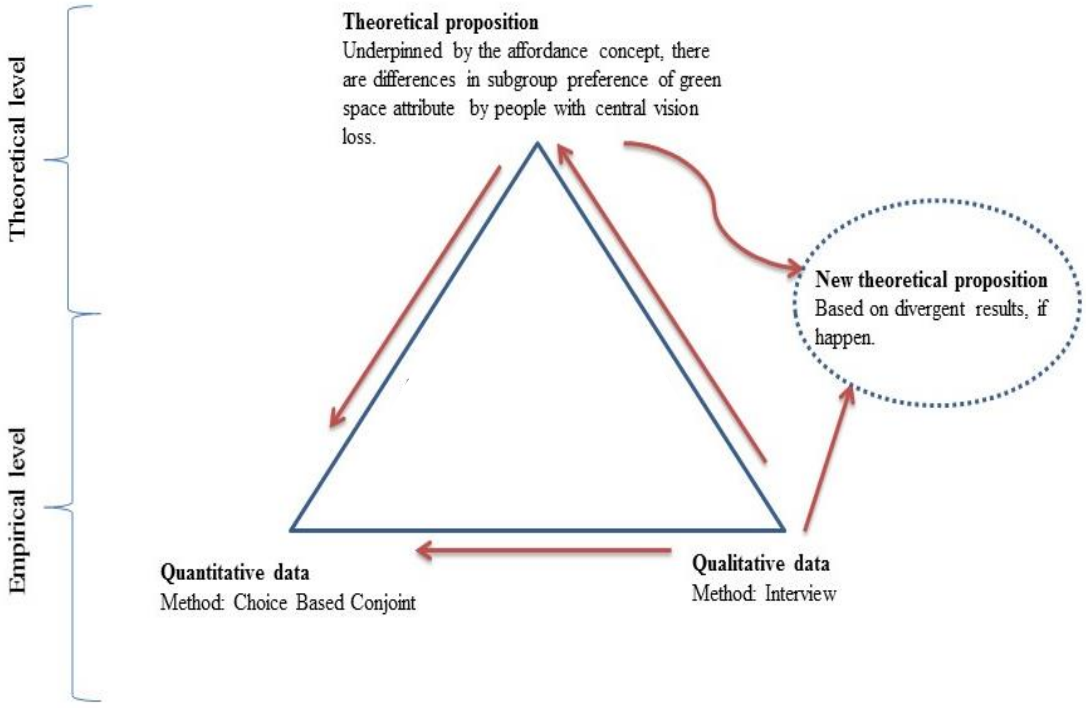


Figure 5.4 Triangulation convergent design that support the theoretical proposition (model adapted from Oslund et al. (2011).

5.9 Ethical considerations

This research was subject to the Edinburgh College of Art's Code of Research Ethics under Level 2 because it involved people with disabilities. The research proposal was granted the approval of the Ethics Committee for Level 2 submission on 10 July, 2013 (see Appendix 9).

5.10 Summary

A mixed method design was employed as the methodological framework in this research. The combination of focus group, conjoint survey and interviews allowed extensive understanding and also covered the full range of research issues. A triangulation strategy was adopted to improve the validity and reliability of the data and also to check the complementarity of each method's findings, i.e. whether they were convergent or divergent.

The main challenge when carrying out data collection on people with a visual impairment was obtaining access and trust, because this group of people are deemed to be vulnerable and the conversation must be conducted in a very ethical manner. Apart from that, the participants' visual limitations were also a major challenge because they had to read the questionnaires and mark their answers accordingly.

The focus groups were very helpful in gaining an insight into the participants' perceptions that led to their preferences. This method is vital because the literature contained little evidence about the green space attributes that matter to this group of people. Based on the focus group findings, the questionnaire was designed using CA software to achieve a high design efficiency. The CBC survey was administered manually using paper and pencil because of the limited computer literacy of the participants. Finally, two types of interview were conducted; the walk-along and home interview, according to the preference of the participant.

The next chapter presents the findings from the three methods described in this chapter.

Chapter 6: Results and findings

6.1 Introduction

This chapter begins with the findings of the focus group discussions, which were designed to gain an insight into the views of people with AMD regarding green space attributes. The findings were used to set the parameters for the development of the CBC questionnaires, and to consolidate the quantitative findings pertinent to the important features in a park. Following this, the results of the CA will be presented. An HB method was applied in estimating the part-worth or utility score, which reflects the priorities of the attributes and their levels in decision-making regarding the preferred park. The qualitative findings will be presented in the last segment of this chapter, which discusses the semi-structured interviews. This method was used to further explain the relationship between emotional affordance and preference. The details of the findings will be explained further in this chapter, segment by segment, following the same structure as that used in the previous chapter.

6.2 Findings from the focus group discussions

6.2.1 Important features of the green space

The discussions were based on the three main themes as explained in the methodology in Chapter Five. They are as follows: activities participants do in the park, preferred park features and pleasant and unpleasant experiences in the park. Altogether, 20 keywords were gathered from the analysis using the distribution of keywords (frequency) method (see Figure 6.1). Since this method does not suggest priorities, the features with similar characteristics were grouped together under the same keywords. The frequency of the keywords, however, does not reflect the significance levels of the features.

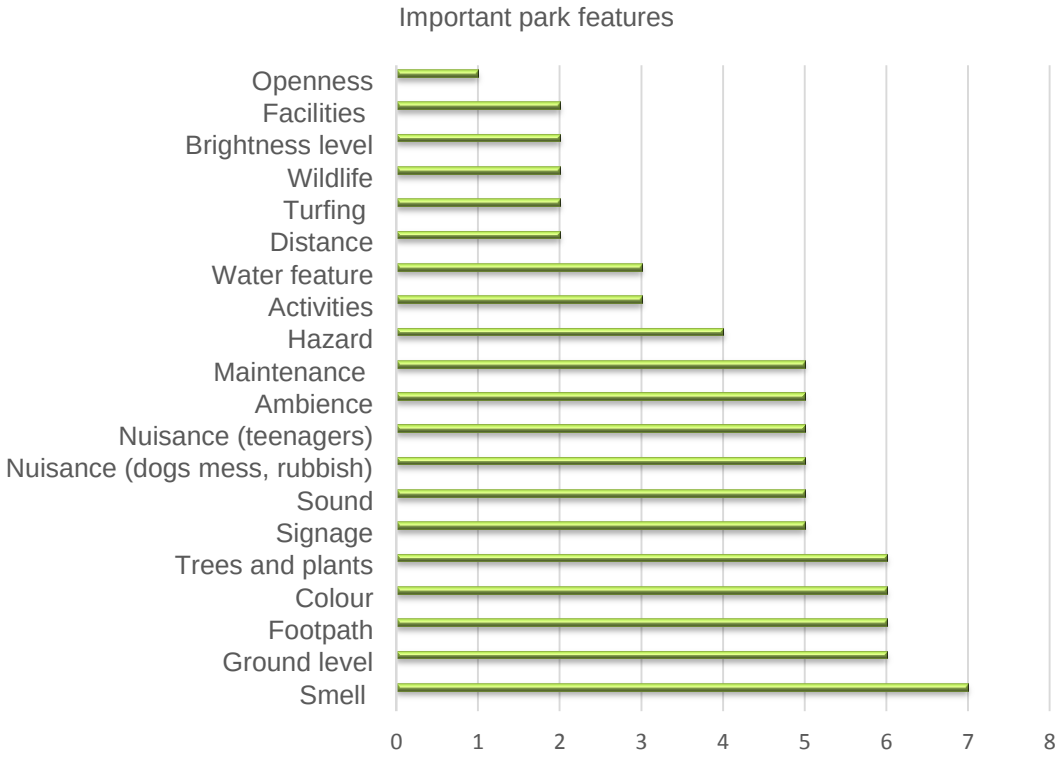


Figure 6.1 The keywords of the important features in the park.

6.2.2 Qualitative findings from the focus group

Data from the focus groups were analysed to obtain an in-depth understanding of how people with AMD use green space in their daily lives. The basis of the inquiry was the features that matter to this group of people when they are in contact with green space. Three major themes emerged explaining the features that were significant to them: the physical attributes, management of the park and the social connections that influenced them when visiting the park.

6.2.2.1 Physical attributes

Several categories were identified through a coding process of the focus groups' data corpus. These categories that were highly significant to the study participants were the colour contrast, sensory design features, natural setting of the green space and the activities offered by such space.

The colour contrast features mentioned by the participants included the colours of the flowers and leaves, signage and also the demarcation of footpath edges. The contrast element has become highly significant to people with AMD because reduced visual acuity in the central visual field causes major problems in seeing details and recognising people's faces. Furthermore, the participants mentioned that they can only see the colours of certain flowers that bloom in the early spring, such as daffodils.

I think if it has a splash of colour, I think it will be nice, like a splash of daffodils in the spring. Woman aged above 80, from London Road, Edinburgh.

Yellow and bright, really bright red, you know, the yellow or bright red, for me, they are good colours. Woman aged above 80, from Morningside, Edinburgh.

Some of them mentioned the demarcation of the steps and edges of the footpath that help them identify the changing levels of the footpath. Apart from that, the bold and contrasting signage was also important to the participants in order to get information about the park and also to help them find their way around the park.

It is very difficult to spot uneven ground. I think there should be some way of marking the edges of the steps so you could see that the end of your down. This is where I find the stick is invaluable. Man aged above 80, from Morningside, Edinburgh.

The sensory design features were also mentioned by the study participants as one of the important features in the park. They said that the fragrant flowers were important to them because they could smell rather than see them due to their visual limitations, especially in the central vision field.

The sound of the water features was also cited as one of the significant sensory design features in the park, notably the soothing sound produced by the water flowing down a small stream. Meanwhile, natural green space or natural settings such as woodland were perceived as the best place to walk.

I enjoy walking in a park, but cannot appreciate flowers so much. I enjoy a walk around the grounds in the new hospital at Larbert with my husband. There are woods and I like being in the woods. There is a nice feeling about being in the woods. I enjoy being there. Woman aged above 80, from Falkirk.

Good design features should also offer various types of activities for the users. From the perspective of the participants, most of them preferred passive activities requiring less movement, such as walking slowly while enjoying nature or just sitting on a bench relaxing. Nevertheless, some of them liked engaging more actively, such as walking the dog, taking children to the playground, feeding the birds and fish in the pond and fly fishing.

6.2.2.2 Park management

The second theme that emerged was the management of the park. This theme consists of two categories, maintenance and the presence of nuisance. Maintenance was perceived as an important feature in the park because in having a good maintenance routine, the park can be hazard-free, particularly along the footpath. The participants mentioned that uneven pavements were terrible things for them because they cannot see them. They may cause them to trip and fall.

Uneven pavements are a problem. I fell and broke my ankle when my balance was affected by a slippy surface. Woman aged above 80, from Falkirk.

Apart from maintenance, the other category was the absence of nuisance from rubbish, dog mess and also teenagers hanging around. Although these nuisances can be categorised under maintenance, they were considered an avoidable nuisance that simply requires an awareness to prevent it from affecting them.

People just throw rubbish everywhere. I pick up rubbish a lot. I am picking up empty crisp bags, and I think it is ridiculous. Woman aged above 70, from London Road.

We normally avoid teenagers in the park. Woman aged above 70, from Falkirk.

6.2.2.3 Social connections

This was the last theme to emerge from the focus group data. It is worth mentioning because the opportunities for making social connections in the park influenced the participants' preference for the green space. There is only one category under this theme – social association.

Social association means the support the participants get when visiting the green space. It can come from family members or friends. This support has become the discriminator for the type of activities participants engaged with in the park. Such activities lead to a preference for certain features in the park.

> *I take my grandchildren to the playground. Sometimes, we feed the fish in the pond. Man aged above 80, from Falkirk.*

To this participant, the playground was an important feature in the green space, while for other participants it was not preferred because of the associated noise. Some participants preferred to sit and relax on a bench while enjoying listening to the birds. Some of them visit the park with a friend and they just like to sit and talk.

> *I like to go to the park with my friend and we just sit and listen to chatter. Sometimes I just listen to the children laughing while playing in the playground. Woman aged above 80, from Falkirk.*

6.2.3 Development of attribute and level for CBC questionnaire

There were four themes identified as high-level attributes based on the grouping of keywords with similar characteristics. These themes became the attributes of the CBC questionnaire and the features later became the qualitative level of the attributes (see Table 6.1).

No.	Themes	Keywords	Description (based on the focus group discussions)
1	Sensory	Smell	Fragrant smells of flowers and plants

		Colour	Bright colour of flowers and plants
		Water feature	Sound of water feature
		Signage	Touchable plants and tactile signage along footpaths
2	Physical	Vegetation	Presence of many plant species
		Signage	Bold and contrasting signage
		Shade	Shade of large trees
		Ambience	Natural setting
3	Social	Wildlife	Presence of wildlife
		Activities	Children's playground
		Openness	Open field and game area
		Ambience	Quiet semi-enclosed area
4	Accessibility	Footpath	Good quality of footpath surfaces
		Ground level	Provision of handrails on the slopes
		Colour contrast	Clearly marked steps
		Distance	Within short distance of home

Table 6.1 Attributes grouping.

6.3 Finding from the Choice-based Conjoint (CBC) survey

6.3.1 Preferences for leisure activities

This question was put in the first section of the questionnaire for the purpose of gaining an understanding of the priorities with regard to green space in a broader context. This information is important for further research and also in decision-making regarding the provision of green space in the neighbourhood. The result is presented as the median value (Md) because this is the best way to present the Likert-type data that uses an ordinal scale for ranking (Boone and Boone, 2012).

Based on a scale of 1 for least preferred, to 6 for most preferred leisure activities, the most preferred activity was listening to music and the radio (Md=5.5). The male respondents showed a higher preference for this activity (Md=6) than the female respondents (Md=4). Listening has become an important activity for this group of participants because it does not require any physical mobility or moving about outside.

The preference for leisure in green space, represented by walking, was the second most preferred activity (Md=4). This preference was also similar to that of those attending the group meeting (Md=4). In both activities, male and female respondents showed the same level of preference (Md=4). All results are shown in Table 6.2.

The preference for walking in the park indicates that people with AMD have a need for contact with green space. However, it was ranked as a second priority after listening to music or radio, which requires less mobility, particularly in the outdoor environment. Therefore, it is hypothesised that the preference for leisure time activities in the green space is associated with participants' physical and other difficulties such as knee problems, back pain, a heart condition or hearing problems.

To prove this hypotheses, a chi-square test for independence was performed to investigate the association between a preference for walking in the park and the demographic background of the respondents. The result shows that there is a statistically significant association between a preference for walking in the park and the variable of 'other difficulties' (p-value=0.1).

	Writing for pleasure	Reading or listening to audio book	Walking in the park	Attending the group meeting	Listening to music	Surfing the Internet
Overall						
Md	1	3	4	4	5.5	1
Breakdown by gender						
Male						
Md	2	1	4	4	6	1
Female						
Md	1	5	4	4	4	1

Table 6.2 Preferences for leisure activities.

6.3.2 Relative importance of the attributes

Apart from investigating the needs of green space in a broader context, the relative importance of green space attributes also needs further assessment. This assessment was conducted using the CBC survey in which the questionnaire was developed based on the parameters identified in the focus groups. Four green space

attributes were assessed in the questionnaire: physical, social, accessibility and sensory. Overall, the attribute ‘social’ became the highest priority in the participants’ decision-making with regard to their preferred park, with an average importance of 30.60%. This was followed by the attribute ‘accessibility’ with an average importance of 25.54%. The attribute ‘physical’ became the third priority with an average importance of 22.41%, while the attribute ‘sensory’ became the last priority in their decision-making, with an average importance of 21.45%.

Attributes	Average Importance (%)
Social	30.60
Accessibility	25.54
Physical	22.41
Sensory	21.45

Table 6.3 The average importance of the attributes.

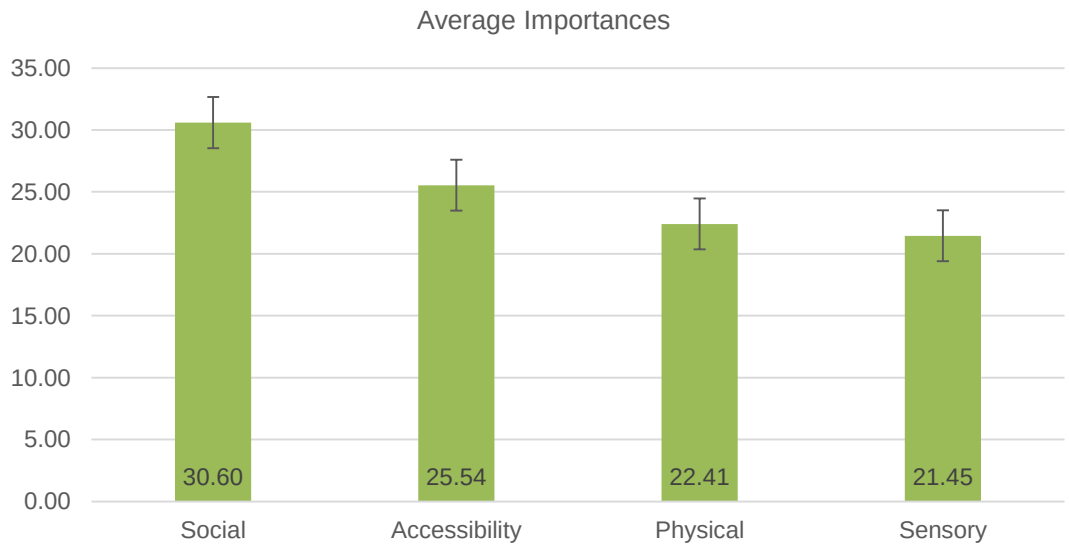


Figure 6.2 Graph of the average importances.

The priorities were measured by the average importance assessed from the part-worth or utility value for each level, called the average utilities, with the mean equal to zero, or the zero-centred difference (see Table 6.4). The utility value is assigned by the computer to represent each level but does not determine any

attractiveness of the levels. The detailed explanation can be found in Chapter Five (Section 5.6.4.1).

Attribute and levels	Average Utilities
Attribute 'physical'	
Presence of many plant species	3.32
Bold and contrasting signage	18.65
Shade of large trees	-18.40
Ambience of the natural setting	-3.57
Attribute 'social'	
Presence of wildlife activities	10.14
Children's playground	-11.54
Open field and games area	-16.77
Quiet semi-enclosed area	18.17
Attribute 'sensory'	
Fragrant smell of flowers and plants	21.20
Bright colour of flowers and plants	-0.43
Sound of water feature	-12.59
Touchable plants and tactile signage along footpaths	-8.18
Attribute 'accessibility'	
Good quality of footpath surfaces	-0.63
Provision of handrail on the slopes	5.29
Clearly marked steps	26.81
Within short distance of home	-31.47

Table 6.4 Average utilities of each attribute level.

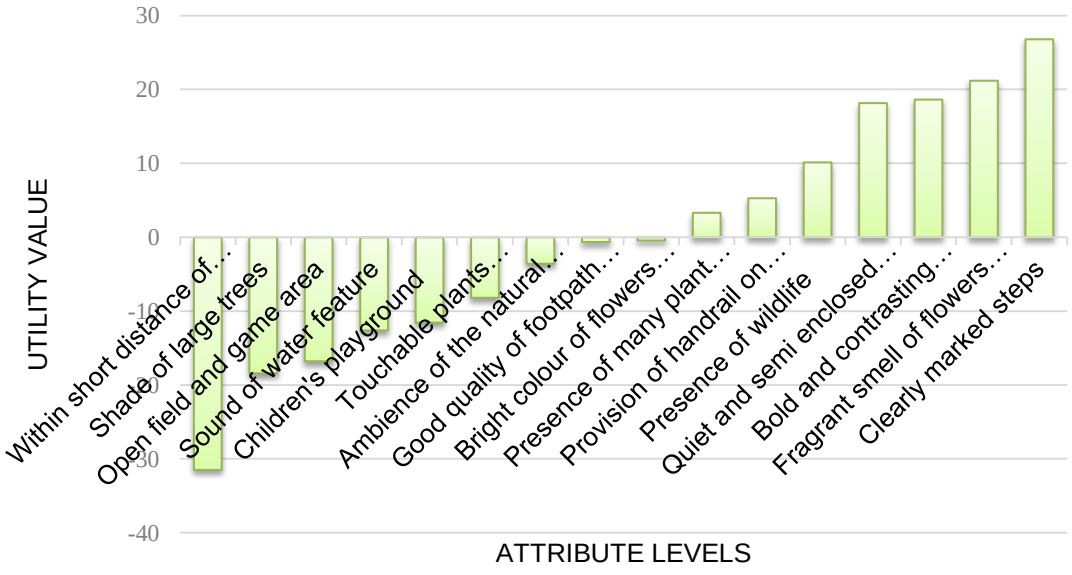


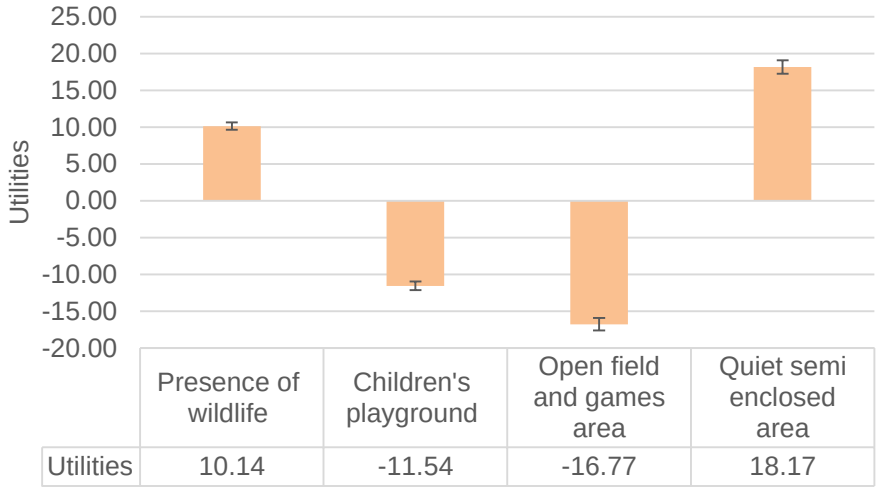
Figure 6.3 Comparison of all attribute levels.

The highest positive utility value of the level represents the most desirable feature in the green space. Conversely, the worst negative value represents the least desirable feature. These values indicate how influential the feature is in the participants' preferred park decision-making (see Figure 6.3).

6.3.2.1 Attribute 'social'

The attribute 'social' was the most important attribute of green space indicated by people with AMD. The social attribute consists of four levels of park feature; that is, 'the presence of wildlife', 'a children's playground', 'an open field and games area', and 'a quiet semi-enclosed area'. The attribute is called 'social' because all levels represent features that nurture social contact and activities in the green space, as identified in the focus group discussions.

The highest positive utility value indicates that the 'quiet and semi-enclosed area' was the most important feature in the park followed by the second-highest positive value; the 'presence of wildlife'. Meanwhile, the worst negative value indicated that the 'open field and games area' was the least important feature in the green space. Although a 'children's playground' was also an important feature in the park, however, the slightly better value shown indicates that it was more desirable than the 'open field and games area'.



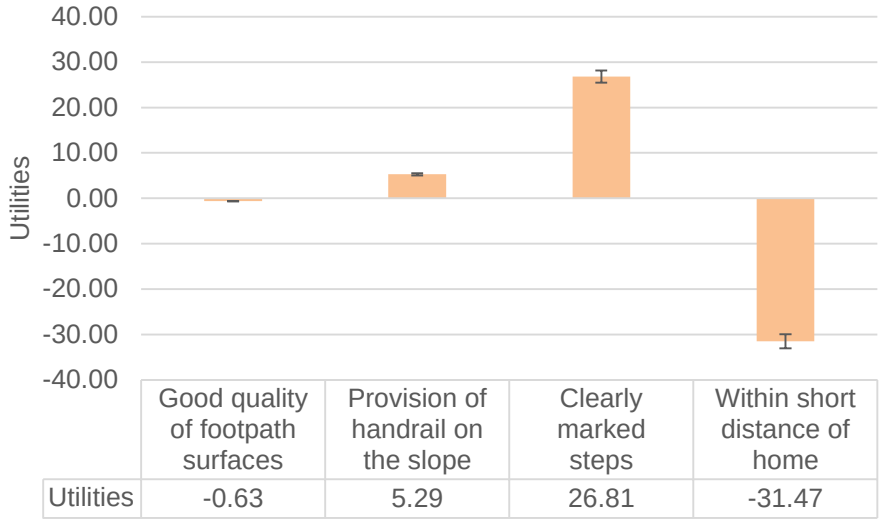
	Presence of wildlife	Children's playground	Open field and games area	Quiet semi enclosed area
Utilities	10.14	-11.54	-16.77	18.17

Figure 6.4 Attribute 'social' and the levels.

6.3.2.2 *Attribute 'accessibility'*

The second important attribute of the green space is the 'accessibility'. It consists of 'good-quality footpath surfaces', 'provision of a handrail on the slope', 'clearly marked steps' and 'within a short distance of home'. It is named 'accessibility' because the levels in this attribute were identified as those features that promote the park's accessibility.

The highest positive utility value is the level 'clearly marked steps', indicating that this feature was the most desirable in the park. Meanwhile, the lowest positive value of 'provision of a handrail on the slope' suggests that this feature was the second most important in participants' decision-making in terms of their preferred park. The worst negative value of the level 'within a short distance of home' indicates that proximity was not as important as the other features in the same attribute. The small negative value of 'good quality of footpath surfaces' indicates that this feature was close to being a desirable feature in the park.



	Good quality of footpath surfaces	Provision of handrail on the slope	Clearly marked steps	Within short distance of home
Utilities	-0.63	5.29	26.81	-31.47

Figure 6.5 Attribute 'accessibility' and the levels.

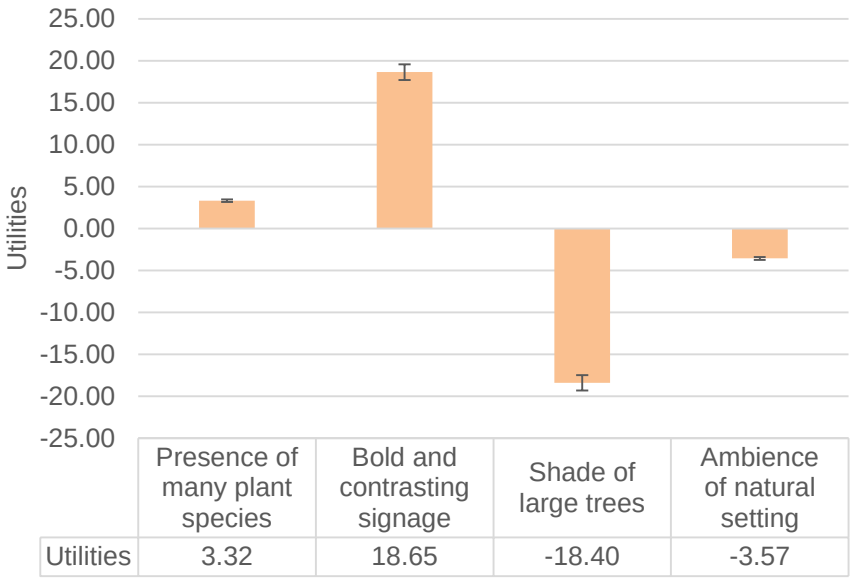
6.3.2.3 *Attribute 'physical'*

The third important attribute in the green space was the 'physical'. This attribute consists of four levels: 'presence of many plants species', 'bold and contrasting signage', 'the shade of large trees' and 'the ambience of the natural

setting' (see Figure 6.6). These levels are the landscape design features that are significant for people with AMD, as identified in the focus groups.

The highest positive utility value in this attribute is the 'bold and contrasting signage'. This indicates that this was the most important feature to the respondents when choosing their preferred park. The second most important feature is 'presence of many plants species', as shown by the second-highest positive value. On the other hand, the worst negative value is 'the shade of large trees'. This value indicates that it was the least important park feature compared to the other levels. The second least important feature, with an improved negative value, is the 'ambience of natural setting'.

Overall, the result showed 'shade of large trees' and 'bold and contrasting signage' to have almost similar values regardless of the positive or negative value. The values indicate that the relatively important features in the park were things related to the level of lighting that created a colour contrast. This colour contrast may influence the quality of vision of people with AMD.



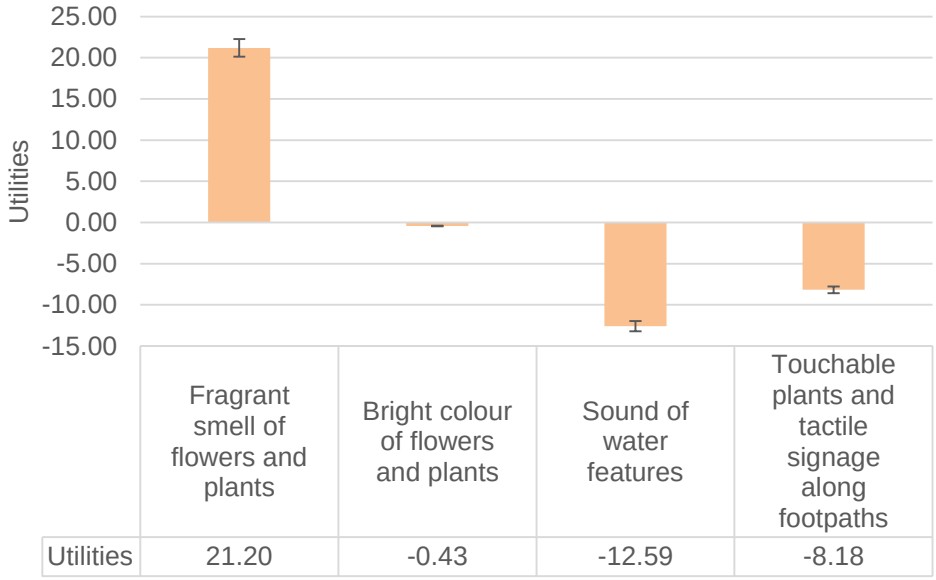
	Presence of many plant species	Bold and contrasting signage	Shade of large trees	Ambience of natural setting
Utilities	3.32	18.65	-18.40	-3.57

Figure 6.6 Attribute 'physical' and the levels.

6.3.2.4 Attribute 'sensory'

The fourth attribute, the least important, was the attribute 'sensory'. This was called 'sensory' because it consists of four levels that represent the sensory features

identified from the focus groups; ‘the fragrant smell of flowers and plants’, ‘bright colour of flowers and plants’, ‘sound from the water feature’ and ‘touchable plants with tactile signage along the footpath’. The result shows that the most important feature in this attribute is ‘the fragrant smell of the flowers and plants’, with the highest positive utility value. Among the three other levels, the nearly zero value of ‘bright colour of flowers and plants’ indicates that it is close to being an important feature in the respondents’ decision-making for their preferred park. The second least important feature was ‘touchable plants and tactile signage along the footpath’. The worst negative value indicates that the ‘sound from the water features’ was the feature in the park that respondents considered the least important.



	Fragrant smell of flowers and plants	Bright colour of flowers and plants	Sound of water features	Touchable plants and tactile signage along footpaths
Utilities	21.20	-0.43	-12.59	-8.18

Figure 6.7 Attribute ‘sensory’ and the levels.

6.3.3 Differences in sample preference

The average importance in the sample profile was examined to establish whether differences in the respondents’ preferences were associated with a different demographic profile. A CBC comparison analysis using covariates was not considered appropriate because the minimum number of respondents in one subgroup should not be less than 200 for CBC analysis (Orme, 2013) and the small number of respondents was well below this recommendation. For this reason,

descriptive statistics using SPSS were used instead to test for any significant differences between the subgroups' preferences.

The sample preference was examined using the non-parametric Mann-Whitney U test to find any significant differences in the preferences of those with different demographic profiles.

A significant difference was found with regard to the attribute 'social' between men (Md=27.98, n=17) and women (Md=33.25, n=33), U=170.50, z=-2.25, p=0.024, r=0.3. The difference means that the women showed a higher priority for this attribute compared to the men. However, the rest of the attributes did not show any significant difference between the gender profiles (see Figure 6.8).

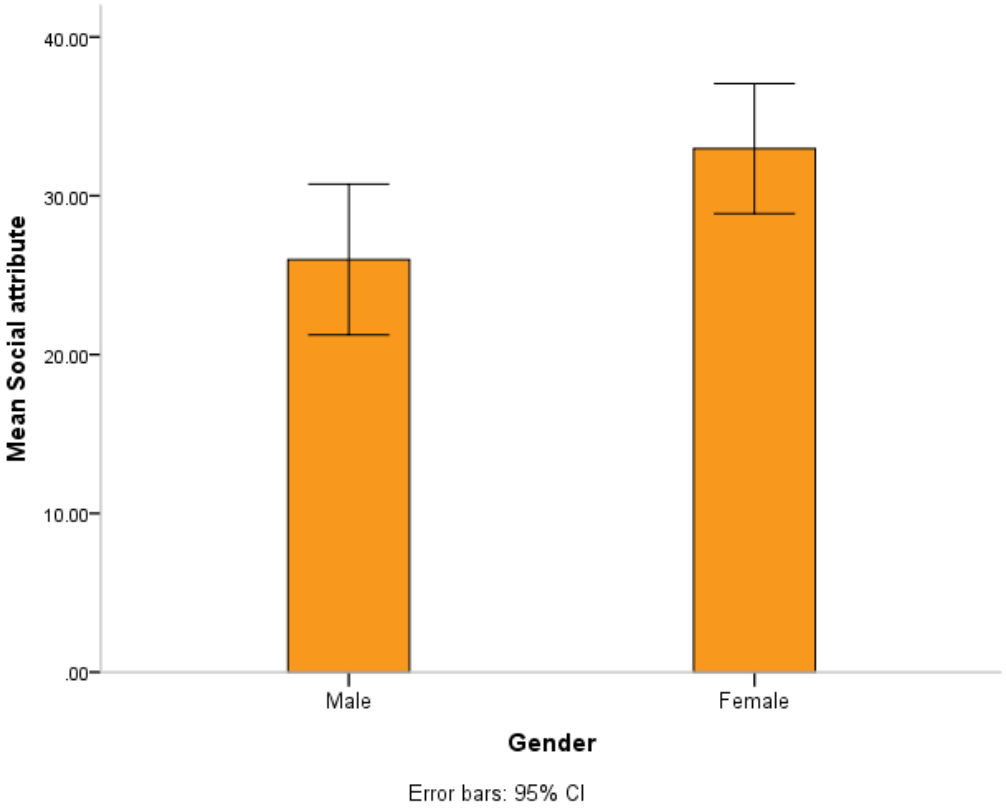


Figure 6.8 Gender difference in attribute 'social'.

There was also a significant difference in the relative importance of the eyesight condition. The test revealed that there was a significant difference in the preference for the attribute 'physical' between respondents with fair to moderate eyesight (Md=16.45, n=25) and people with severely impaired eyesight (Md=24.86, n=25), U=207, z=-2.04, p=0.041, r=0.3. This difference means that people with

severe eyesight impairment place a higher priority on the attribute 'physical' compared to people with better eyesight (see Figure 6.9).

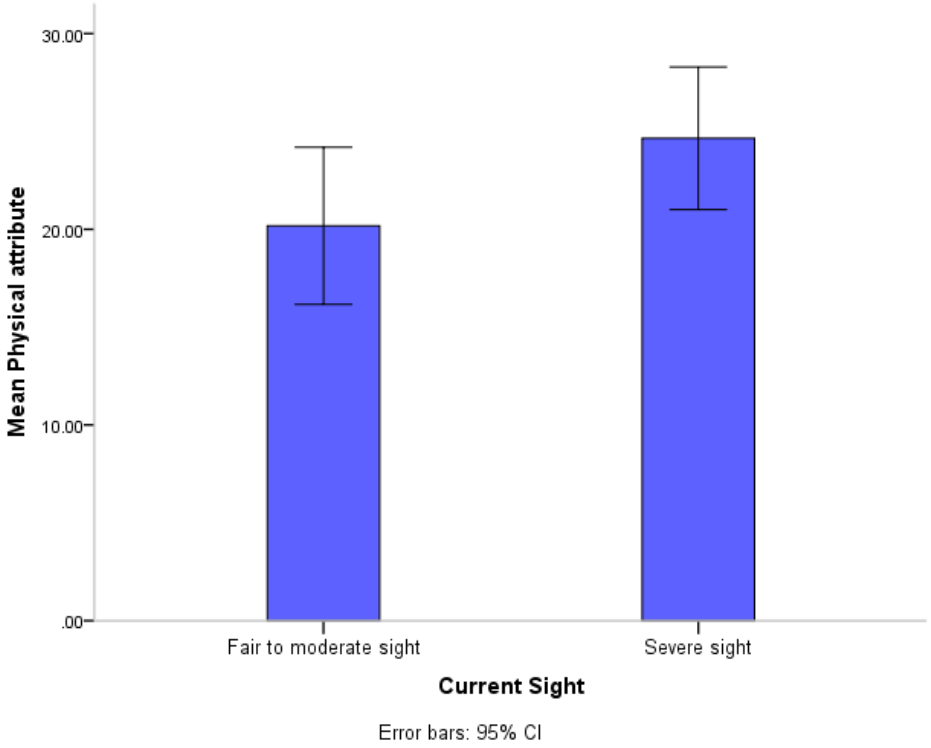


Figure 6.9 Condition of eyesight difference in attribute 'physical'.

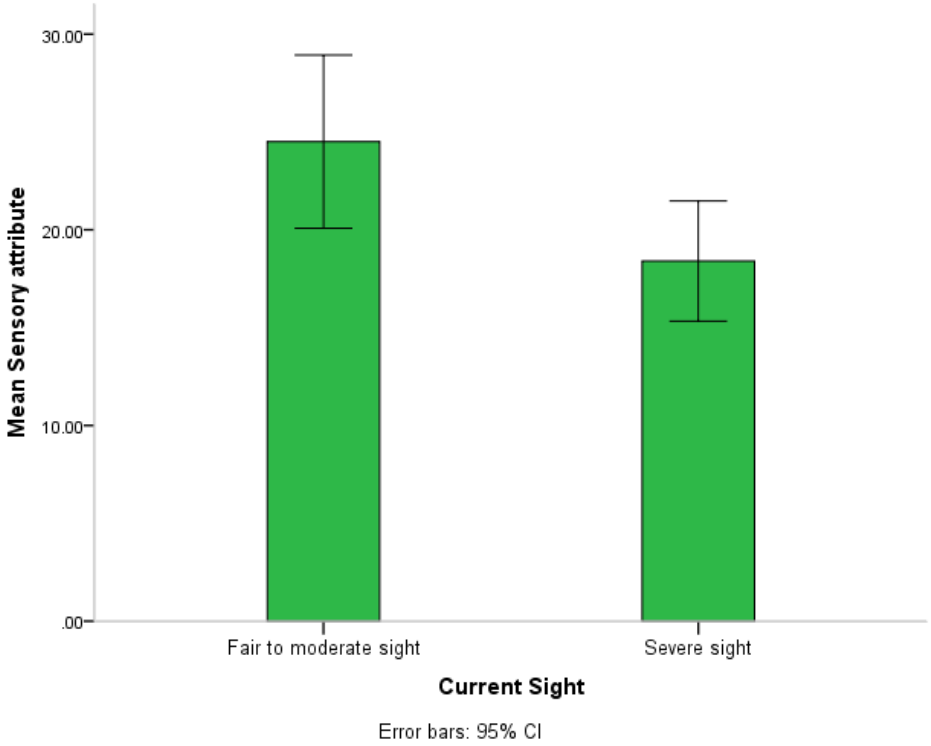


Figure 6.10 Condition of eyesight difference in attribute 'sensory'.

Respondents with better eyesight also assigned a higher priority to the attribute ‘sensory’ compared to respondents with severely impaired eyesight. The test revealed a significant difference regarding preference for the attribute ‘sensory’ between people with fair to moderate eyesight (Md=16.45, n=25) and people with severely impaired eyesight (Md=24.86, n=25), U=207, z=-2.04, p=0.041, r=0.3 (see Figure 6.10). The overall results from the test are presented in Table 6.7 below.

Attribute	Variable	Median, (Md)	Sample, n	U	Z	p (2-tailed)	r
Social			Gender				
	Male	27.98	17				
	Female	33.25	33	170.5	-2.25	0.024	0.3
Physical			Sight condition				
	Fair to moderate	16.45	25				
	Severe	24.86	25	207	-2.04	0.041	0.3
Sensory			Sight condition				
	Fair to moderate	22.3	25				
	Severe	17.86	25	207	-2.047	0.041	0.3

Table 6.5 Mann-Whitney U test results.

6.3.4 Subgroup preferences

The subgroups were divided based on the respondents’ self-rating of their feelings towards their sight loss. Although many clinical measures have been used to interpret feeling, the literature review suggested that it is best described by the individual themselves (Kahneman, 1999). The feelings suggested by the Macular Disease Society counsellor were anger, frustration, anxiety and sadness. The non-parametric Kruskal-Wallis test was performed to identify the significant differences between the groups of respondents with different reported feelings. The test identified that there was a significant difference in the preference for physical attributes across the three groups (Group 1, n=35: not feeling angry at all; Group 2, n=10: feeling slightly angry; Group 3, n=5; feeling considerably angry), X^2=6.28, p=0.043 (see Table 6.6).

Attribute	Variable	Median, (Md)	Sample, n	X^2	df	p (2-tailed)
Physical			Feeling angry			
	Not at all	23.11	35			
	Slightly	15.02	10			
	Considerably	31.68	5	6.282	2	0.043

Table 6.6 Kruskal-Wallis test results.

The median suggests that the group of respondents who felt considerably angry placed the highest priority on the attribute 'physical', while the group that felt slightly angry assigned a lower priority to the same attribute.

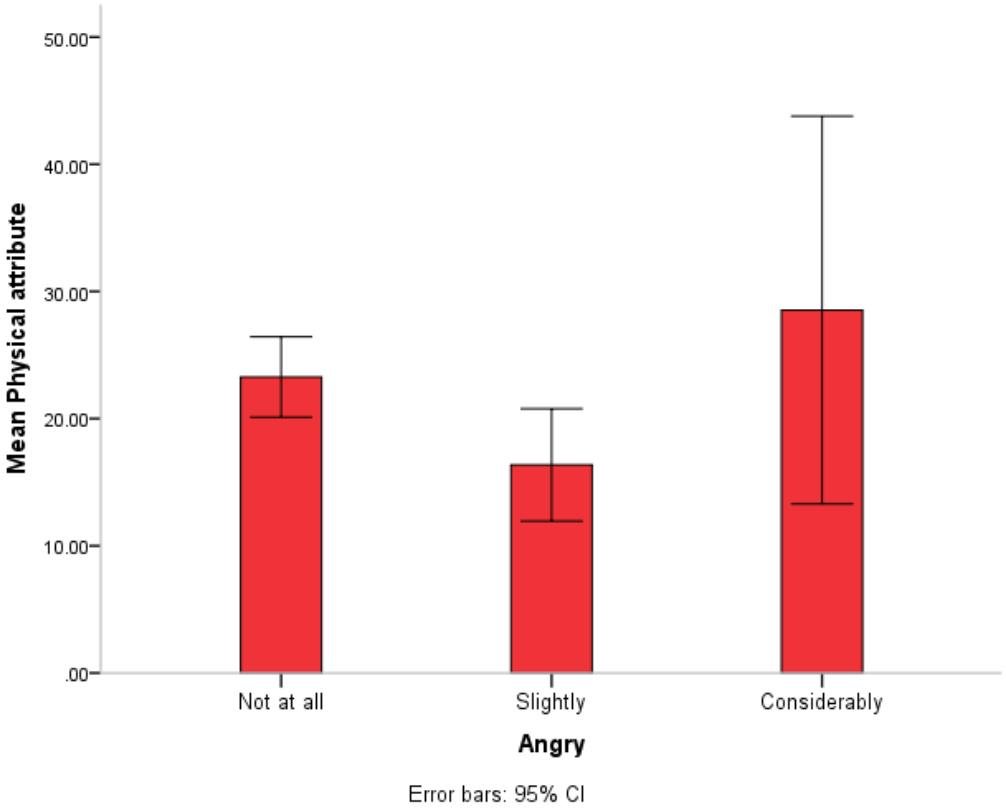


Figure 6.11 Significant difference of feeling angry and attribute 'physical'.

A post hoc test using a Mann-Whitney U test was performed between pairs of groups to identify the significant difference between groups. The result showed that there was a significant difference between the group of respondents who felt no anger at all and the group of respondents who felt slightly angry (U=100, p=0.041).

The group who felt no anger at all placed the highest priority on the attribute 'physical'.

The post hoc test also identified another significant difference between the group of respondents who felt slightly angry and the group who felt considerably angry (U=6.00, p=0.02). The group who felt slightly angry placed the highest priority on the attribute 'physical'. Nevertheless, there was no significant difference between the group of respondents who felt no anger at all and the group who felt considerably angry.

Apart from these results, overall, no significant difference was identified between the groups of respondents with different reported feelings.

6.3.5 Correlations

Non-parametric correlations were explored to identify the link between preference and the data variables to further understand the effect of demographic profile, preferred leisure activities and the participants' feelings. This analysis aimed to open up more opportunities to investigate the relationship between the variables in future research.

First, the relationship between average importance and demographic profile was tested. A medium, negative correlation was found between preference for sensory attribute and duration of sight loss, r=-0.22, p=0.023 (p-value=0.05 level, 2-tailed). This suggests that respondents who had suffered sight loss for a longer period of time had the lowest preference for the attribute 'sensory'. The same attribute also showed a medium, negative correlation with the respondents' eyesight condition, r=-0.30, p=0.039 (p-value=0.05 level, 2-tailed). It suggested that respondents with severely impaired eyesight had the lowest preference for the attribute 'sensory'. Conversely, respondents with severely impaired eyesight showed a higher preference for the attribute 'physical' compared to the attribute 'sensory'. This is shown through a medium, positive correlation between those two variables, r=0.30, p=0.039 (p-value=0.05 level, 2-tailed).

Next, the relationship between average importance and preferred leisure activities showed that there is a medium, negative correlation between preference for the attribute 'sensory' and surfing the Internet, r=-0.31, p=0.035 (p-value=0.05 level,

2-tailed). Surfing the Internet also showed a medium but positive correlation with preference for the attribute ‘accessibility’, r=0.03, p=0.038 (p-value=0.05 level, 2-tailed). These results suggest that respondents who prefer to surf the Internet during their leisure time have the least preference for the attribute ‘sensory’ but placed a higher preference on the attribute ‘accessibility’.

Finally, the relationship between the average importance of green space attributes and the respondents’ feelings was tested. It was found that there is a medium, negative correlation between preference for the attribute ‘sensory’ and feeling frustrated where r=-0.32, p=0.023 (p-value=0.05 level, 2-tailed). This result suggests that respondents with a considerable feeling of frustration have a higher preference for the attribute ‘sensory’.

6.3.6 Exploratory answer tree of the average importance

An answer tree analysis was performed as an exploratory analysis to understand the interrelationship between the relative importance of the attributes and the predictive pattern within a decisional hierarchy. This method can be used to identify the best sequence by which to use the independent variables to optimise the decision-making process. The Classification and Regression Tree algorithm was used as growth criteria to fit the purpose of the analysis. In the analysis, the dependant variables were the relative importance of the attributes ‘social’, ‘accessibility’, ‘physical’ and ‘sensory’. Each dependent variable was split into binary groups to represent the priority placed on each by the respondents.

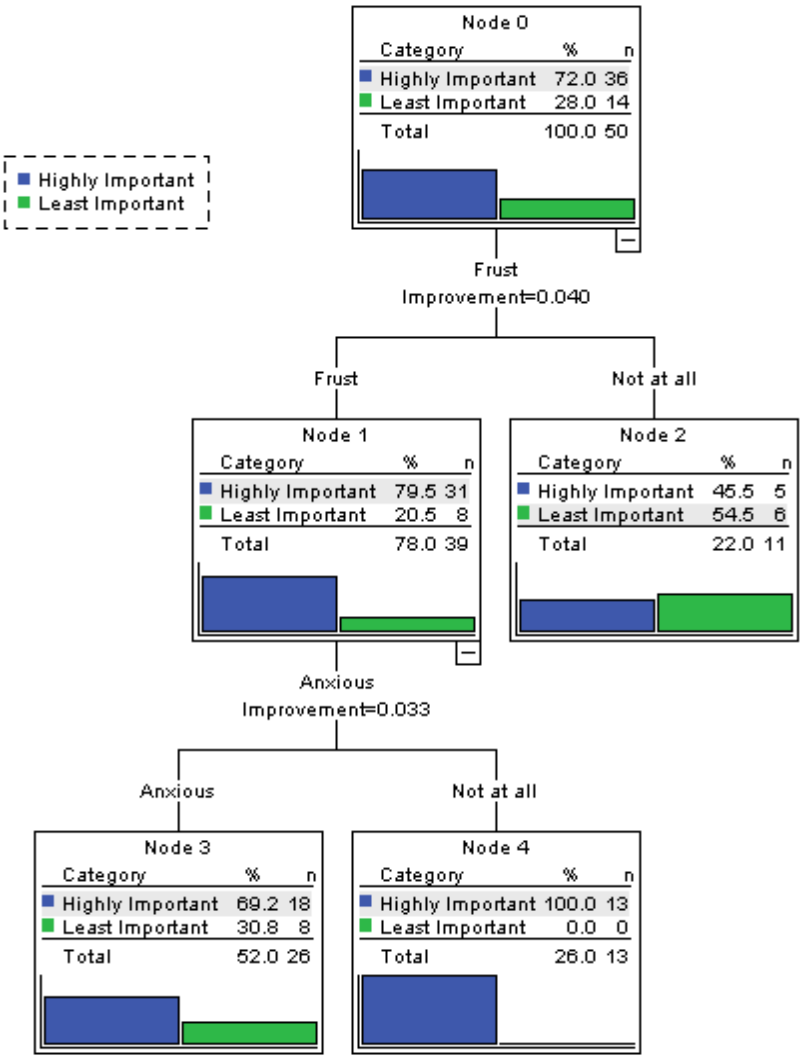
6.3.6.1 Answer tree of the attribute ‘social’

This answer tree shows the most significant predictor of higher priority placed on the attribute ‘social’ in the green space versus the lower priority placed by the study respondents as identified at the top of the tree and shown in Figure 6.12.

The most significant predictor for these priorities was the variable ‘feeling of frustration’, as shown at the first level of the tree. The reported feeling was caused by sight loss. This level shows that those who did not feel frustrated at all are likely to place a lower priority on the attribute ‘social’ by a factor of one (i.e. a ratio of one

person who placed a higher priority to one person who placed a lower priority on the same attribute) compared to the group of people who reported a feeling of frustration by a factor of four.

For those who felt frustrated because of sight loss, the best discriminator is the feeling of anxiety where the subsequent split is based on those who do not feel anxious at all versus those who feel anxious as a result of their sight loss. The second level indicates that the group of people who have no feeling of anxiety placed a higher priority on the attribute 'social' by a factor of 13 (i.e. a ratio of 13 people who placed a higher priority to one person who placed lower priority on the same attribute) compared to the group of people who felt anxious, by a factor of two.



(Note: Frust=feeling of frustration)

Figure 6.12 Answer tree of the preference in attribute 'social'.

This answer tree shows that although the feeling of frustration is a significant predictor of the priority given to the attribute 'social', the feeling of anxiety also makes a significant contribution to the priority given to this attribute. The misclassification matrix shows that this answer tree model has an overall success rate of 74%, with better prediction for those who placed a higher priority on the attribute 'social' (86.1%) compared with a lower priority (42.9%) as shown in Table 6.7.

Classification			
Observed	Predicted		
	Highly Important	Least Important	Percent Correct
Highly Important	31	5	86.1%
Least Important	8	6	42.9%
Overall Percentage	78.0%	22.0%	74.0%

Table 6.7 Misclassification matrix of the attribute 'social'.

6.3.6.2 Answer tree of the attribute 'accessibility'

The attribute 'accessibility' was placed second in the relative importance of the green space attributes, following the attribute 'social'. The answer tree of this attribute showed that the most significant predictor of the priority of this attribute was the feeling of anxiety, as shown at the top level of the tree in Figure 6.13.

This level indicates that those who felt anxious as a result of their sight loss are likely to place a higher priority on the attribute 'accessibility' by a factor of two (i.e. a ratio of two people who placed a higher priority to one person who placed a lower priority on the same attribute) compared to the group of people who did not feel anxious, by a factor of 0.5. This means that the majority of people in this group placed a lower priority on the attribute 'accessibility'.

For those who reported not feeling anxious at all, the best discriminator is the living arrangement, where the subsequent split is based on those who live alone versus those who live with other people, whether this is a spouse, children or relatives. For the group of people who lived with someone else, they were highly likely to place a lower priority on the attribute 'accessibility' by a factor of six (i.e. a ratio of six people who placed a lower priority to one people who placed a higher

priority on the same attribute) compared to the group of people who lived alone, by a factor of two.

For the group who felt anxious, the best discriminator is gender. Males are highly likely to place a higher priority on the attribute ‘accessibility’ by a factor of four (i.e. a ratio of four people who placed a higher priority to one person who place a lower priority on the same attribute) compared to females by a factor of one.

This answer tree showed that the significant predictor of the priority placed on the attribute ‘accessibility’ is the reported feeling of anxiety caused by sight loss. The living arrangement and gender also have a significant contribution on the priority of the same attribute. The overall success rate of this answer tree model is 64%, with a better predictor for those who have placed a higher priority on the attribute ‘accessibility’ (70.8%) compared with a lower priority (57.7%) (see Table 6.8).

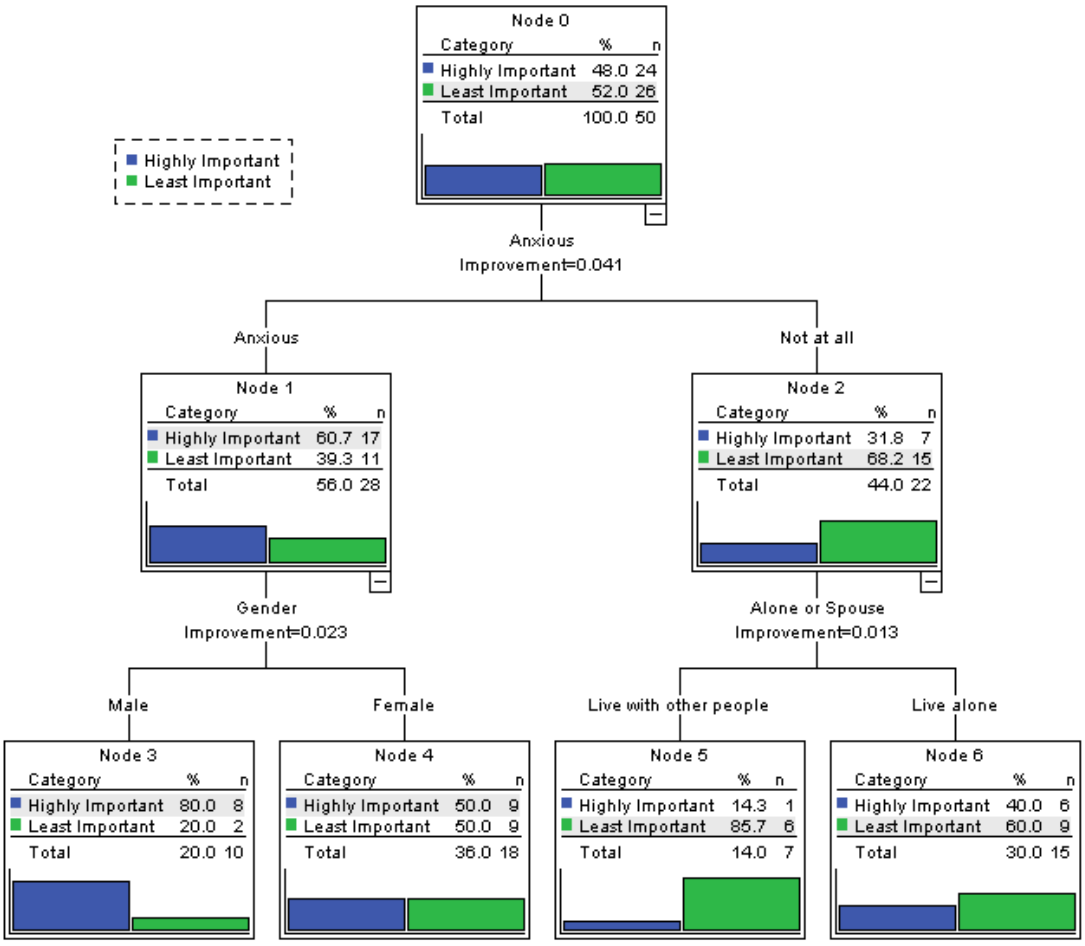


Figure 6.13 Answer tree of the preference in attribute ‘accessibility’.

Classification			
Observed	Predicted		
	Highly Important	Least Important	Percent Correct
Highly Important	17	7	70.8%
Least Important	11	15	57.7%
Overall Percentage	56.0%	44.0%	64.0%

Table 6.8 Misclassification matrix of the attribute 'accessibility'.

6.3.6.3 Answer tree of the attribute 'physical'

The answer tree of the relative importance of the attribute 'physical' shows that the most significant predictor of the priority placed on this attribute was the reported feeling of frustration caused by sight loss, as shown in the first level of the tree in Figure 6.14. This level indicates that those who felt frustrated are highly likely to place a lower priority on the attribute 'physical' by a factor of two (i.e. a ratio of two people who placed a lower priority to one person who placed a higher priority on the same attribute) compared to the group of people who do not feel frustrated at all by a factor of one.

For those who have not reported any feeling of frustration, the best discriminator is age, where the subsequent split is based on those aged below 80 versus those older than 80. For the latter group, people aged over 80 were highly likely to place a higher priority on the attribute 'physical' by a factor of five (i.e. a ratio of five people who placed a higher priority to one person who placed a lower priority on the same attribute) compared to the group of people who are aged below 80 by a factor of one.

For the other group of people who feel frustrated due to their sight loss, the best discriminator is the duration of the sight loss, where the subsequent split is based on those who had suffered AMD for more than three years versus those who had had AMD for less than three years. The group of people with a shorter duration of sight loss are likely to place a lower priority on the attribute 'physical' by a factor of six (i.e. a ratio of six people who placed a lower priority to one person who placed a higher priority on the same attribute) compared to the group of people who had AMD for a longer period by a factor of one.

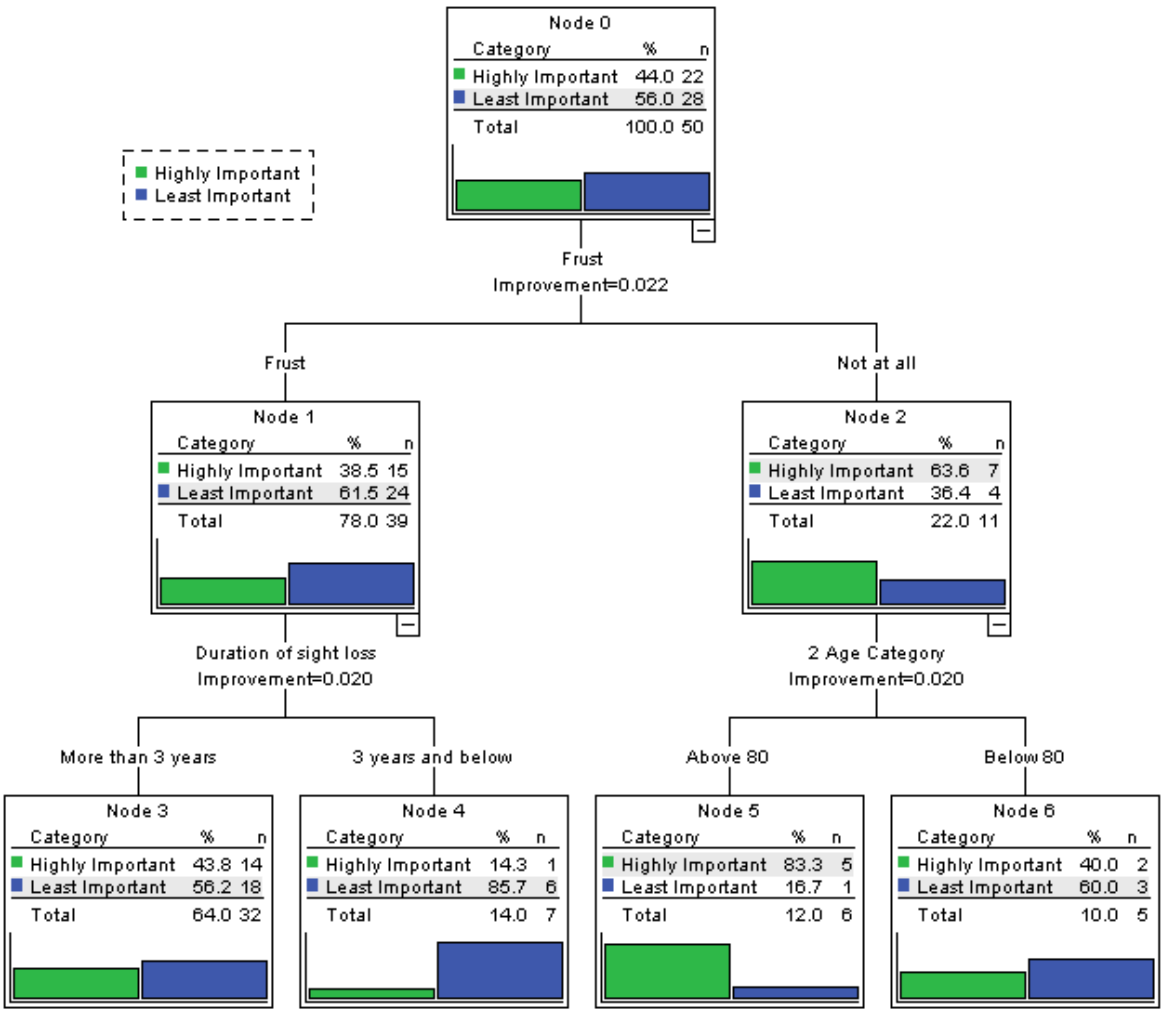


Figure 6.14 Answer tree of the preference in attribute 'physical'.

Classification			
Observed	Predicted		
	Highly Important	Least Important	Percent Correct
Highly Important	5	17	22.7%
Least Important	1	27	96.4%
Overall Percentage	12.0%	88.0%	64.0%

Table 6.9 Misclassification matrix of the attribute 'physical'.

This answer tree has shown that the significant predictor of the priority placed on the attribute 'physical' is the reported feeling of frustration caused by sight loss. The duration of sight loss and age also have a significant contribution on the priority of the same attribute. The overall success rate of this answer tree model is 64%, with a better predictor for those who placed a lower priority on the attribute

'physical' (96.4%) compared with those who placed a higher priority (22.7%) (see Table 6.9).

6.3.6.4 Answer tree of the attribute 'sensory'

The answer tree of this attribute shows that the most significant predictor of the priority placed on the attribute 'sensory' was the reported feeling of frustration caused by sight loss, as shown at the first level of the tree in Figure 6.15. This level indicates that those who have not felt frustrated at all are highly likely to place a higher priority on this attribute by a factor of two (i.e. a ratio of two people who placed a higher priority to one person who placed a lower priority on the same attribute) compared to the group of people who have not felt frustrated, by a factor of 0.4.

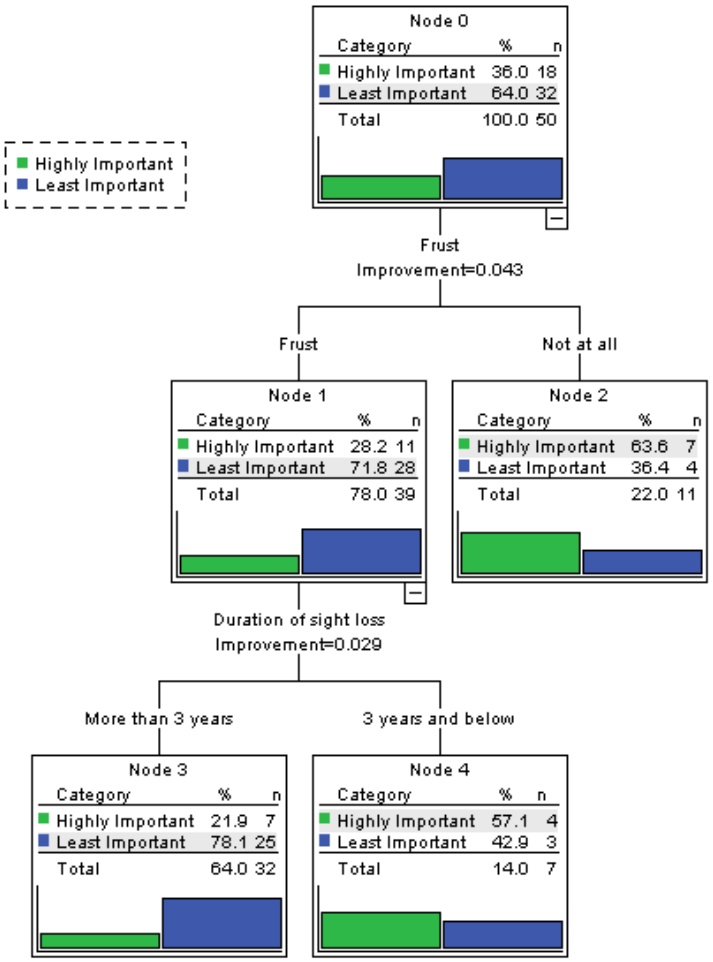


Figure 6.15 Answer tree of the preference in attribute 'sensory'.

The second level shows that for those who have feelings of frustration, the best discriminator is the duration of sight loss, where the subsequent split is based on those who have had AMD for more than three years versus those who have had AMD for less than three years. The latter group placed a lower priority on this attribute by a factor of four (i.e. a ratio of four people who placed a lower priority to one person who placed a higher priority on the same attribute) compared to the group of people who suffered AMD in a shorter period by a factor of one.

This answer tree shows that the significant predictor of the priority placed on the attribute 'sensory' are the respondents who felt frustrated as a result of their sight loss. The duration of sight loss also makes a significant contribution on the priority respondents placed on this attribute. The model has an overall success of 72%, with better prediction for those who have placed a lower priority (78.1%) compared with a higher priority (61.1%) as shown in Table 6.10.

Classification			
Observed	Predicted		
	Highly Important	Least Important	Percent Correct
Highly Important	11	7	61.1%
Least Important	7	25	78.1%
Overall Percentage	36.0%	64.0%	72.0%

Table 6.10 Misclassification matrix of the attribute 'sensory'.

6.4 Finding from the interviews

6.4.1 Interview locations

As described in Chapter Five (Section 5.7.2.4), five people agreed to participate in the walk-along interviews. Due to ethical considerations, only participants who were fit to walk in the outdoor environment were invited via verbal or written invitations. Participants were asked to select their favourite place, the one that they visited frequently for various purposes.

Four of the participants selected the nearest park to their home as the location for the interview. They were very familiar with the places because they visit them on a weekly basis. The main purpose of the visit was to walk, either for exercise or to

get some fresh air and relax. One participant chose the park close to the train station in the middle of Glasgow city centre, where he used to relax after a long journey before heading home. Sometimes, he just sat and watched the activities taking place in the park. Eight participants were interviewed in their homes because of the limitations posed by their physical health. Most had been advised by their doctors not to leave the house alone or to walk outside for long periods.

6.4.2 The emotional state of the participants

In general, the participants expressed various feelings towards their visual impairments, such as feeling disappointed, upset, angry, anxious and frustrated. For participants suffering from wet AMD, a condition that can take hold very suddenly, sometimes overnight, the feeling expressed was shock. However, some of them already felt resigned because they had come to a state where they believed that nothing could be done anymore.

The most recently diagnosed participant expressed being angrier and more upset compared to participants who had a longer duration of sight loss. However, the duration of sight loss was associated with age and sight condition. The most common reason for them to feel angry and frustrated was because the onset of AMD had led to limited mobility. Two of the most reported conditions that made the participants feel frustrated were not being able to read and not being able to recognise people's faces, even people standing right in front of them.

R5- I can see distant landscapes quite well but not the detail of gardens. Somebody told me that there was a magnolia growing down the road, and I had not seen this magnolia. But I went up at it yesterday to look at it and so, I still got enough sight when I get close to see it. But I missed a lot of things because I can't see from a distance (sighing).

R6- You do not get invited to the place, there is the thing. You know, few years before you may be invited to, sometime (paused) you know. Not always but sometime.

R10- I see enough not to walk into a wall or something. But to read and to recognise the people I cannot. To recognise the people, is one of the worst things because, I am pretty deaf as well. If you cannot read the lips, you can't hear clearly. So that will get a bit awkward.

6.4.3 The role of green space as a compatible environment

The findings suggest that green space has to be compatible with the affordance of the visually impaired and it is important to have a good-quality environment that fits with the functional significance of the elderly, especially those with a visual impairment. This finding also shows that the participants can only benefit from the restorative effect of green space if the environment fits their affordance. There were four factors prioritised by the respondents concerning what such an environment must offer: proximity to where they live, the opportunity for various activities, a natural setting and public acceptance.

6.4.3.1 Proximity to the home

After being diagnosed with AMD, all of the participants had to give up driving. This dramatically reduced their independence and degree of outdoor mobility and therefore it is difficult for them to travel far. In turn, they depend more on the nearby neighbourhood green space because it is easier to get to. Some of them also had physical conditions that did not allow them to go very far from home.

R1- I live by the river, quite close. I would walk on one side and cross over on a bridge.

R2- Down the back road there, there are two entrances. One at the front, one at the back. Down that road after four houses, there is the path that enters the park.

6.4.3.2 Activities

The neighbourhood park was also used as a place to undertake various activities. Most of the respondents used the green space for walking and sitting, enjoying the fresh air and listening to the birds. One of the participants used the park close to his home because it was located on the way to the town.

R4- I like to go out and sit in the park. I can still go out if I go with somebody. I would walk there for exercise. I enjoy walking on the grass there.

R2- I can walk to the town from here. I go through the park all the way, close to the hospital. I have to stop regularly though.

Figure 6.16 Meeting other park users (source: author).

One of the participants who participated in the walk-along interviews was very excited when he met with other park users. He made the trip on a weekly basis just to walk and relax in the park. According to him, this is one of the ways that he can meet and talk with other people. It makes him feel better rather than sitting alone at home. This conversation shows that the green space offered him an opportunity for social interactions.

6.4.3.3 Natural setting

In both of the interview methods, the participants were more focused on the natural elements of the park as a preferred attribute. They mentioned that this kind of space brought them closer to childhood memories, which aroused feelings of contentment and relaxation and eliminated the feeling of frustration caused by their visual impairment. This participant was the one who used a guide dog for navigation because she had a severe eyesight impairment. She expressed a feeling of frustration about becoming blind. Walking in the park is the only thing that makes her feel better.

R6- I have come here so many times. We used to come here as children, and we used to have much amusement, not like what we have today. It is so safe compared to before. We did a lot more natural things. At the bottom, there is a little stream, and we used to catch tadpoles. We used to get down and get them in a jar (laughs happily).

Figure 6.17 Participant walking in the park with her guide dog (source: author).

R6- When you lose your sight, you cannot see that bit. Many people, when they see you walking, they say hello. They see you get into difficulty, and they actually offer help. Apart from that, they do not want to hold a bit of conversation with you. You are not invited to their place. There is a thing, you know, a few years before, you may be invited sometimes, you know.

Figure 6.18 The stream in the park along the footpath (source: author).

Another respondent with better eyesight also mentioned that he went to the park because he loved to hear the gurgling of the water running down the small stream in the middle of the park. The sound made him feel relaxed.

R8- I walk and sit. Then walk to the river. It is quite nice. You can get a view of Fife from here. You can hear the gurgling water. It is very nice. It runs down to the sea.

6.4.3.4 Public acceptance

The last way in which green space was perceived as a compatible environment was when the participants felt confident moving about in it. However, there was a social issue raised by the participants which affected their feeling of comfort and confidence in the park. This was their perception of the degree to which they were publicly accepted in the park. This was mainly linked to cyclists and other people's dogs, whether or not the latter are on a leash.

R2- I am not against a bicycle, but used to cycle a lot. When you walk along a nice path, and you do not hear people coming. All I want is for the cyclist to ring the bell.

R12- I mean, that is not an enjoyable experience. I mean, I have to stop there, at the railing along the water of Leith, because of the cyclists. The dogs are there, but I cannot see them. I got dog free many many years ago. I am just terrified of falling because of them because sometimes they just run in front of you.

The participants' visual and hearing limitations made them unaware of approaching cyclists and dogs. This situation made them feel intimidated when they were sharing the footpath with other users. On the other hand, members of the public cannot distinguish people with a visual impairment caused by AMD because the impairment does not cause any changes to their physical appearance and sufferers appear normal to other park users.

6.4.4 Green space as a medium to encourage individual motivation to undertake outdoor activities

Three main things were identified as significantly affecting the participants' emotional well-being: first, not being able to recognise previously familiar faces such as those of family members, friends, neighbours and anybody in close proximity to them. Secondly, not being able to read their favourite book or newspaper, which they had done as a daily routine prior to losing their sight and the last thing, that had had a devastating effect on the participants, was the sudden limitation in their mobility. Almost all of the participants expressed feelings of frustration and anger as a result of these factors. Although some of them felt shocked and upset following their diagnosis, many of them had already resigned themselves to their condition because, to date, there is no cure for AMD and they had suffered from the condition for many years.

However, this study found that a suitable environment in a green space can offer a restorative effect in terms of these feelings. Certain physical attributes of green space can help participants to feel less frustrated or angry. These attributes can encourage their motivation to undertake physical and social activity outside. Three factors that support individual motivation in the green space were identified: first, green space can encourage self-confidence in moving around outside. Secondly, a specific physical attribute in the green space can allow a person to remember childhood activities and favourite activities from before they starting losing their sight. The third factor is that green space can bring about a feeling of self-worth in the participant. The last factor is that green space provides a place for them to engage in their favourite activities with support from their families and close friends.

6.4.4.1 Self-confidence

Throughout the study, it has been confirmed that green space boosts the self-confidence of people with AMD to venture into the outdoor environment in a hazard-free space. These people can use the green space as they used to do before being diagnosed with sight loss. Therefore, they can also gain emotional restoration in the green space. The qualitative inquiry identified several green space attributes that help

participants regain their self-confidence in the outdoor environment. The main contributing attribute is the safety of the space, particularly the footpath. This was the main one mentioned by all of the participants in the interviews. A hazard-free footpath was a priority for them to be able to move confidently around the park, especially for people with a severe sight impairment. In addition, familiarity also plays a role in encouraging self-confidence in the park. Familiarity is only gained when the participants visit the park frequently, and the most frequently visited parks were those closest to their homes.

When the participants perceived a green space as a safe place in which to walk, in conjunction with familiarity, they could move confidently and be less attentive. This led to them feeling more content in the green space.

R5- When I go to the park, I stick to a path that has been made. I would not in fact go to the park now at all because the roots of the trees are all over the place and you can easily fall.

R5- I do find it a bit frustrating when I have to look at my feet so much and because I have got to be careful not to trip.

R6- It is hard to spot the uneven pavement. I still go outside, but I've just got to be more careful because of the increased hazard of tripping.

Figure 6.19 Cut grass on the footpath also perceived as hazard (source: author).

6.4.4.2 Memories

During the interviews, the participants talked about their childhood memories and also memories of their preferred activities from times before the onset of their visual impairments. Certain features of a park can bring back those memories. Through this, the sense of appreciation of the green space increased and made them feel content and calm. Also, being able to carry out their preferred activities, even after becoming visually impaired, was a big achievement for the participants.

R10- When I was younger, and I could see, I did private fishing, salmon fishing. It was different from the club. I had to stop eight years ago. How do I get fishing then? In the club, people drive me to where I want to be. …If I am struggling, my boat partner will come and help me up, and when you time it, you cast it out. The fact that somebody is in the boat with me, they can tie up the fly, because it is not easy. It is not easy to cast a fly when you cannot see.

Figure 6.20 A place in the park that used to be an amphitheatre when someone was a child brought positive feelings to one participant (source: author).

6.4.4.3 Self-worth

Green space can encourage feelings of self-worth in people with a visual impairment. However, it also depends on the person's background. Being in a green space can increase their self-esteem, for example, if they worked in or close to a green space in their previous job or as a hobby. On the other hand, for participants who were previously not physically or socially active in a green space, being in a park, especially after losing their sight, can be very intimidating.

For example, a participant who had worked as a gardener tended to be more determined to undertake outdoor activities in the green space. The participants with this kind of background were more optimistic and had been able to bounce back quickly from the emotional distress caused by the visual impairment. Their strong determination to get back to normal life made them less depressed compared to participants with a different background.

R10- I've always had an interest in birds and animals, and the country and farming, but then, the fishing as well. …That is very different, well, you've always done it. Things that you have done and you're good at. Of course when you go blind and deaf, it does not mean you should stop doing it. It is just the same.

R9- I was a gardener at one time. Since I had this macular, my husband has to take care of this. However, I still think of planning and moving things around. Sometimes, I do it myself.

Figure 6.21 Having one's own garden as one of the coping strategies (source: author).

These participants had higher self-worth and a determination to return to as near as possible to the normal life that they had before. Their individual resilience was supported by their preferred activities in the green space attribute. This was one of their coping strategies for dealing with emotional issues.

6.4.4.4 Support from families and friends

The last role indirectly played by green space was that green space has become a place where visually impaired people can obtain support from other people in their life, such as family members and friends. Together, they can do the activities they used to do in their preferred place, such as having a picnic. This kind of space may be the only place where they can have private time with their loved ones while enjoying the outdoor environment. It also makes them feel safer to be with other people rather than being alone. Therefore, this factor also influences the motivation of the participants with regard to undertaking outdoor activities.

6.4.5 Comparison between walk-along and home interview

As explained in Chapter Five, this study intended to use just the walk-along method. However, due to ethical considerations, home interviews were conducted with participants who were not fit to walk in an outdoor environment. Although the inquiries for both methods were based on a similar subject, there was a slight difference in this aspect of the findings. The participants from the walk-along interviews were directly engaged with the environment and this produced an immediate response. They were naturally relaxed and spontaneously expressed their feelings about the attributes they encountered.

Meanwhile, the participants in the home interviews tended merely to express individual explanations about their feelings. The majority felt as though the interview was a counselling session in which they could comfortably speak about how they felt about their sight impairment. It required a lengthy introduction to get them engaged with the interview and they constantly needed to be redirected back to the subject under discussion.

6.5 Summary

The mixed methods used in this study have provided a comprehensive understanding of the participants' preferences regarding green space that influence positive emotional responses. The relative importance of the green space attributes was assessed through a quantitative method using CBC analysis. The findings reveal

that the attribute ‘social’ was the most important in the participants’ decision-making regarding their preferred park compared to other attributes such as ‘accessibility’, ‘physical’ and ‘sensory’. These priorities were determined by the participants’ affordance where the sensory stimuli were no longer the main priority since they had become visually impaired. Furthermore, understanding how preference improves emotional well-being was investigated through a qualitative method using semi-structured interviews. Walk-along and home interviews were conducted to gain insights into the participants’ preferences with regard to green space attributes.

Two emerging themes suggest that the restorative effect of ordinary green space, such as that found in a neighbourhood, can benefit visually impaired people without the need to provide a specific sensory garden, as is commonly discussed by landscape designers and policymakers. Besides, the reduced outdoor mobility of people with AMD was not due to their visual limitations; rather it was linked to the incompatibility of the green space provision.

The next chapter will discuss the overall findings and examine how the outcomes interweave with each other to make a meaningful understanding of the benefits of green space for people with AMD.

Chapter 7: Discussion and conclusion

7.1 Introduction

The previous chapters presented the findings from each of the methods employed in this research: the focus groups, CBC survey and the interviews. These findings will be triangulated in the discussion to increase the validity and reliability. This strategy was best interpreted the result of each method in order to answer the research questions as defined in the Chapter Four. The conclusion will serve as the key answer to the main research question that aimed to understand how people with AMD use green space that led to their emotional restoration.

7.2 Discussion

The results confirmed some of the expected findings. There were also some contradictions within the findings across different methods. Each finding was further examined and compared to the literature review to increase understanding of the reason behind it. The findings suggest there is an issue of independence and risk surrounding people with AMD when they are in green spaces. Having a sight impairment does not limit them from venturing into the outdoor environment. However, they are exposed to the risk of falling due to their limited vision. Some are prone to health conditions such as asthma or knee problems when in the outdoor environment, particularly green space. Spring and summer may be worse for sufferers of asthma.

Notwithstanding these risks, elderly people with AMD always need to be independent since a majority of them live alone. They need to be able to move outdoors for various reasons, such as going to the shops, meeting friends or going to the park for light exercise, relaxation and to enjoy nature. Some made trips to the park simply to meet acquaintances or other visitors' dogs. This finding indicates that green space offers various types of social interactions and that these interactions were determined by the type of green space visited by people with AMD.

The study shows that the most frequently visited green space is the neighbourhood park due to its ease of access, close proximity and familiarity. This

type of green space provides opportunities for social interaction with other people from the same neighbourhood, in addition to interactions with animals such as dogs. Almost all of the elderly people with AMD visited the park alone and as such, had opportunities to meet with other people or their dogs.

The other type of green space frequently visited by elderly people with AMD is the urban park, for example, the Edinburgh Botanical Garden. This type of park plays a mediating role in terms of social interaction between friends and family because of the activities available within it. People with AMD normally visit this park with other people for various reasons such as to walk and chat, have a picnic, do some light exercise, enjoy the seasonal blossoms and to relax. In this case, therefore, distance does not matter because they have some social company. Social company may reduce the fear of risk, however dependency has increased.

Of all the preferred features in green space, water features from natural sources were mentioned as the most significant contributor to emotional restoration as opposed to ponds and lakes that feature only static water. Therefore, this finding suggests there are limits to the decibels that can be heard by the elderly with hearing difficulties as compensation for their loss of vision. This case is worthy of further investigation in widening the benefits of green space to various groups of people.

7.2.1 Research sub-question one: What are the important features of green space to people with late-onset AMD?

The data from the focus groups were analysed using two analytical methods to serve different purposes. Firstly, quantitative analysis was used to identify the parameter of the CBC analysis questionnaire. Secondly, qualitative analysis was used to identify in depth the features that were perceived as significant by the study participants, people with late-onset AMD.

In the focus groups, several features that appeared to be important to the people with AMD emerged. Through the keyword frequency analysis, the most frequently mentioned feature was the fragrant smell of flowers such as roses. The preference for this feature was due to the visual limitation caused by AMD. This disease has made the participants unable to see clearly, especially when focusing on an object right in front of the eyes. This limitation has led them to depend on the

sense of smell more than the sense of sight in order to appreciate the green space features surrounding them. Aside from this, colour contrast also mattered to them. The feature mentioned most frequently by the participants was the yellow splash of daffodils in early spring. The bright yellow of this flower could easily be seen or detected by the participants even though their central vision was impaired. Two more features were also perceived to be important, these being the demarcation of the steps and footpath edges and the presence of bold and contrasting signage. These features represented the importance of the level of contrast for people with AMD when navigating in the green space.

Analysis of the findings from the focus groups revealed the different features that were perceived as important. The sound of water features was considered important by the participants. Moreover, it was common to find a small stream flowing across the park in Scotland and this element produced a soothing sound. The preference for this feature goes some way to explaining some participants' general preference for the natural setting of the green space. In the focus groups, these places were mentioned as participants' favourite places for enjoying walking activities.

Hazard-free footpaths and the absence of nuisance such as rubbish, dog mess and groups of teenagers hanging around were other factors which brought about feelings of apprehension in the participants when they were encountered. However, since the purpose of the CBC analysis was only to measure the physical design features of the green space, nuisances were considered as non-physical design features and a non-compromising attribute in the green space, so were omitted from the questionnaire. Moreover, the participants in this research were all deemed vulnerable and having negative elements in the questionnaire may have resulted in unfit estimates to the purpose of the research. Nevertheless, these aspects should be taken into account since there were deemed important, and they should be dealt with by park management, since they are factors which may prevent use of the park regardless of the presence of attractive features. Aspinall et al. (2010) found that 'lack of nuisance' was the most important attribute of the neighbourhood park cited by older people, so this research reinforces their finding.

The preference for features that produced a fragrant smell, such as roses, becomes more important when the visual senses become limited. This concurs with

Bell (2012), who stated that the auditory and olfactory senses can take over to become the primary senses when the visual senses become limited. This concurs with Hussein (2012), who found that the preferences of blind children in a school garden were focused on the sensory emphasis area. However, this may not the case for people with AMD because evidence from literature reviews has led to a conclusion that having visual memories in life helps the late-onset visually impaired to perform spatial tasks in the same way as sighted people. This might be because they retain some vision and have visual memories so that their senses do no readjust.

The CBC analysis results revealed that the sensory design features were not that important to the people with AMD and were traded off with other important features that were a better fit with their affordance. This finding has demonstrated the strength of using the CA method in this research, where the participants had to make a decision between alternatives that were presented together.

7.2.2 Research sub-question two: What is the relative importance of the green space attributes set by the participants?

Although there were many features mentioned by the participants as being important features, the result from the focus groups analysis does not reveal which of these features is the most significant; indeed, it is not designed to. Therefore, the CA was used as the method to answer this question.

7.2.2.1 The need for green space of people with AMD

In term of the participants' leisure time activities, the analysis indicated that 'listening to music or the radio' was mostly preferred. It is hypothesised that the participants' physical problems have rendered them housebound and they therefore prefer activities requiring less physical movement. Although there was no significant relationship between 'listening to music or the radio' and 'other physical difficulties', the findings from the interviews supported the hypothesis that becoming housebound had influenced the participants' preference for activities that suit their condition. All participants had had to give up driving due to sight loss. AMD had made them less independent and, consequently, reduced their outdoor mobility.

Therefore, the most convenient activity during leisure time was to sit back and relax while listening to their favourite music, radio channel or audio book. Some participants with fair eyesight watched television. A similar finding that reduced visual acuity caused a reduction in physical leisure activities in the elderly was found by Swanson (2012).

Walking in a park or other green space such as woods, a beach or garden was placed as the second most preferred leisure time activity, ranked on a par with 'attending the support group meeting', which also requires outdoor mobility in order to get there. These two activities indicate that outdoor mobility is important even with reduced eyesight. This was supported by the interview findings, (walk-along and home interviews) which showed that green space can encourage an individual's motivation to undertake outdoor activity and stay mobile. By being in the park, for instance, the participants gained the social benefits of having an opportunity to meet other park users, which could provide a further motivation. Furthermore, in the interviews, it was found that the participants were highly dependent on the green space for undertaking physical activity. This explains why walking was placed as the second most preferred leisure activity after listening to music and the radio.

It was expected that due to their older age, the priority of leisure time activities could be influenced by the health and physical condition of the participants. A significant association between the preference for walking in the park and the participants' 'other difficulties' proved that the priorities for leisure time activities were associated with other physical difficulties such as mobility impairment and hearing impairment. This result agrees with that of Douglas and Parvey (2008), who found that degree of outdoor mobility was not associated with reduced eyesight but with age. Aspinall et al. (2008) also found that getting outdoors was perceived as an important activity by people with visual impairment. Therefore, the findings of this section concluded that there is a need for suitable green space for the group of people with visual impairment as a place for them to engage with physical activities that fit with their affordance.

7.2.2.2 The relative importance of the green space attributes

The result from the CBC showed that the attribute 'social' was placed as the most important attribute, followed by the attributes 'accessibility', 'physical' and 'sensory', in that order. The utility value of each level in the attribute 'social' indicated that the features of 'quiet and semi-enclosed space' and the 'presence of wildlife' are the most influential features in determining what constitutes a preferred park. These features were considered to provide opportunities for passive activities which do not require vigorous physical movement. Moreover, these activities nurture the social connections between participants and other beings, whether people or animals (dogs). The participants who preferred these type of features normally went to the park together with other people in order to enjoy listening to chatter or simply to sit on a bench while watching and listening to the birds. This reinforced findings from focus groups and interviews. Ettema and Smajic (2014) found that places with lower activation levels can promote a positive feeling and this could explain the participants' preference for quiet and semi-enclosed spaces in the park. Such a feature fits the affordance of this group.

The next feature of relative importance of green space attributes was 'accessibility'. It was expected that the proximity of green space to home would be one of the important features in encouraging accessibility to green space (Ward Thompson et al., 2004, Nilsson et al., 2011). Surprisingly, the focus groups and CBC both suggested that distance was not particularly important to the participants. This unexpected result was further examined through the interviews when it was found that, actually, the proximity to home was indeed one of the important features of green space, contrary to the previous method's finding. Since having AMD had led to the participants giving up driving, they had to depend on the nearest green space for use on a regular basis, possibly instead of a preferred place that they had used before. Moreover, poor physical conditions such as knee problems had made travelling far an inconvenience for them. The interview findings revealed that participants' physical and health conditions affected their mobility to travel further afield, therefore making them dependent on the nearest green space.

The third important attribute in green space was the attribute 'physical', where the provision of 'bold and contrasting signage' was the most influential

feature defining the preferred park. It was shown to have the highest positive utility value compared to other features within the same group. This feature was significant in terms of helping the participants to find their way around the place and also in obtaining information about the place. The preference for these features showed that the contrast level was significant for people with AMD.

The attribute 'sensory' was placed as the last priority in terms of its relative importance among the four attributes. The most desirable feature in this attribute group was the fragrant smell of flowers or plants. However, when the features in this group were assessed using the CBC, they were traded off for more important features from within the other attribute group. This result shows that people with late-onset AMD perceive different aspects of features to be important compared to other categories of visually impaired people, such as children, for whom sensory-emphasised design features are perceived as more important (Hussein, 2012).

7.2.3 Research sub-question three: Is there any difference in the priority placed on the green space attributes by different subgroups of the participants. If so, how do they prioritise them?

The analysis of variance of the CBC data has shown some significant differences in the relative importance of green space attributes among different subgroups such as gender, the severity of the visual impairment and the state of participants' feeling towards their sight loss.

7.2.3.1 Gender

Gender has a significant influence on the priority of the attribute 'social', whereby women placed a higher priority on this attribute. This demonstrated that female participants seemed to take more notice of the green space features that nurture social connections when deciding on their preferred park. The explanation for this preference was found in the follow-up interview findings, where female participants stated that they used the green space mainly for relaxation or sitting with a friend while enjoying nature. This type of activity explained why quiet and semi-enclosed spaces were perceived as the most desirable feature in the attribute 'social',

as shown through it having the highest utility value. Although male participants also used the green space for relaxation, they used it more for walking exercise and as a route to the shops, bus stop or GP surgery. The differences in the type of activities were supported by the literature, where men tended to show more interest in their physical well-being than women in visually impaired groups (Kirkcaldy and Barr, 2011).

The interviews showed that regardless of gender, the priority shifted when participants had social company either with people or with animals such as dogs. Participants who had a pet or guide dog preferred the open field in the park because they were able to release their dogs or play with them. The qualitative finding from the focus groups was also consistent with this interview finding, where the open field was significant to those people with dogs. This was the same for playgrounds, which were perceived as an important feature for those participants with grandchildren whom they regularly take to the park. They take their grandchildren to the playground and then sit watching them or having a chat to other people.

However, it was found that the playground and the open field were not very important to the participants in general when assessed through CBC, where they had the lowest utility value. Even though these features were considered as a desirable feature in the focus groups and interviews, there were other features from different attributes that were perceived as generally more important than these features. Therefore, they were traded off for more important ones. However, they are clearly important to some people and this minority view should not be ignored.

7.2.3.2 Condition of eyesight

The analysis of variance found significant differences in the priority of the green space attributes according to the degree of severity of the visual impairment. A fair to moderate level of eyesight was measured by the ability to read well with or without reading aids and a severe level of eyesight was measured by participants' inability to read well even when using reading aids. Participants with fair to moderate eyesight placed a higher priority on the attribute 'sensory', represented by the features that have the ability to stimulate the senses, such as the bright colour of flowers, tactile signage, the smell of flowers and the sound of the water features.

Conversely, participants with a severe sight impairment placed a higher priority on the attribute ‘physical’ resulting from the most important feature in this attribute group, ‘bold and contrasting signage’, and as shown by the highest utility value. These two significant differences can be explained by the priorities that were determined as a result of the state of participants’ visual condition. People with fair and moderate eyesight tended to focus on the features that can offer visual stimulations compared to those people with poor eyesight. Those with good eyesight can still read well with or without reading aids. Therefore, when they use a green space, they can more easily appreciate the place and enjoy the visual sensory stimulation for a more pleasant experience. It was expected that the participants who can see well in the park do not need to be too attentive to, for example, surfaces, compared to those participants with poorer eyesight. Therefore, they can take in the sensory stimulation rather than needing to look down for hazards on the footpath. However, the relationship between fair eyesight and the preference for sensory design features is worthy of further examination.

On the other hand, the interview findings help to provide an explanation for why participants with severe sight impairment placed a higher priority on the attribute ‘physical’ as opposed to the attribute ‘sensory’. With a severe sight impairment, people have to be more cautious and attentive when in contact with the outdoor environment. Thus, information provided through signage was perceived as the most important feature. This group of people have to depend on bold and contrasting signage in order to find their way around the place, including obtaining information about the plants and park. For this reason, ‘bold and contrasting signage’ was the most desirable feature in the park, as shown by its highest utility value compared to the other features in the same attribute.

7.2.3.3 The feeling of anger caused by sight loss.

The third discriminator of the significant differences between subgroups was the feeling of anger caused by sight loss. The group of participants who felt considerably angry placed a higher priority on the attribute ‘physical’. The reason for this was indicated in the interview findings, whereby the changes that AMD effected in the participants’ lives made them feel upset, frustrated and considerably angry,

especially those with a very recent diagnosis. These reported feelings concur with those reported in the literature, where the most frequently reported feelings by people with visual impairment were anger and frustration (Southwell, 2012). The changes have huge implications for their lives and they have to adapt to a new situation. Furthermore, reduced eyesight causes the participants to depend on the available information when being outdoors, particularly in unfamiliar green spaces. For this reason, the presence of bold and contrasting signage was perceived as the best feature to provide them with necessary information that fits with the condition of the visual impairment.

In addition, the interview findings also revealed that participants perceived the physical appearance of the naturalness as the most desirable feature in the green space. This finding concurs with much of the evidence in the literature stating that the most preferred feature is anything related to nature (Bowler et al., 2010; Ahmad et al., 2011; Ward Thompson and Aspinall, 2011; Hofmann et al., 2012). Natural settings such as woodland and rural areas were mentioned as the most preferred places to visit because these type of places can offer a sense of relaxation. The preference for rural settings was corroborated with findings from Roe and Aspinall (2011), where a rural walk was found to be effective in restoring mental health. Moreover, a rural area was perceived as being safe by the participants.

Surprisingly, the interview participants who were reported to have a considerable feeling of anger were those who had previously worked closely with nature or who had spent much of their time in nature for hobbies or work. Having to move away from their normal lives and outdoor activities and being unable to do their favourite activities after developing AMD had made them feel frustrated and angry. This explained why this group of people placed a higher preference on places with a natural setting. By having the opportunity to be in such a space and to use it as before was perceived as an achievement and thus helped to restore their positive feelings.

Although there was no significant difference found in the variable ‘feeling of frustration’ and the relative importance of all attributes, the answer tree result showed that the ‘feeling of frustration’ was the best independent variable for predicting the priority of the green space attributes, as found in the answer tree

analysis of the relative importance of the attributes ‘social’, ‘physical’ and ‘sensory’. For example, the higher priority of the attribute ‘social’ was discriminated by the group of people who reported being considerably frustrated by their sight loss. Those who felt frustrated tended to place a higher priority on this attribute. Meanwhile, the lower priority of the attribute ‘physical’ and ‘sensory’ were discriminated by the group of people who did not report any feeling of frustration. These results were supported by the interview findings and also by evidence in the literature that the most commonly reported feeling by people with AMD was frustration, caused by the changes in their lives and their limited mobility. The second level of the answer tree of the attributes ‘physical’ and ‘sensory’ showed that the duration of sight loss was the main discriminator for the group of people with a ‘feeling of frustration’. This suggests that there was a relationship between these variables. This result indicates that the association of the feeling and the preference is worthy of further investigation. However, no significant difference was found between this variable and relative importance, indicating that all subgroups had the same priorities for green space.

7.2.4 Research sub-question four: What are the factors that influence the relative importance of the green space attributes?

Two factors emerged from the focus groups and interviews that influenced the participants’ ranking of the relative importance of the attribute. The first factor was the individual circumstances of the participant, such as their feeling caused by sight loss, degree of physical and hearing impairments and visual limitations. The second factor was the degree of participants’ social connection with other people. This connection includes the social support they get from other people and also the perception of public acceptance of people with AMD.

In the interviews, the commonly expressed feeling of the participants after being diagnosed with AMD was shock. They feel like their life is over when the primary senses are affected by the untreatable disease (Holz et al., 2013; Uribe and Buckley, 2013). An ophthalmologist can only offer them treatment to stop the disease from getting worse or at least slow down the process of sight loss. Nevertheless, all participants reported that they did not notice any changes even after

years of having treatment. Consequently, at some stage, they become resigned to the impairment. This was especially the case for those who had AMD for longer periods – 10 years or more. Some of the participants were in denial about having a visual impairment.

Various reported feelings were considered as the emotional affordance of the participants that shaped their preference for certain features in the green space. This influence therefore resulted in the different priority of the green space attributes. The interview findings further explained the differences. It was found that those who reported feelings of frustration and anger were those who had been diagnosed with AMD less than three years ago. The answer tree analysis also showed parallel findings. The main discriminator to the 'feeling of frustration' in the 'physical' and 'sensory' attributes answer tree was the duration of sight loss. These findings corroborate the literature stating that people who have visual impairment for less than three years tend to suffer from higher emotional distress (Brown and Barret, 2011). Additionally, having the disease causes massive changes in participants' lives, especially in their ability to read.

Given that AMD commonly affects older people who may also be physically frailer, having a combined impairment seems inevitable for most sufferers because the prevalence of both sight and hearing problems increases with age (Lupsakko et al., 2002). A majority of the participants also had a hearing impairment and some had a physical impairment too. These impairments influenced their preference in addition to the AMD. For example, in the interview findings, participants with a hearing impairment felt more insecure and apprehensive when sharing a footpath with other users. They preferred to use the green space with support from other people such as family members or friends. The presence of social company also influenced the type of activities they undertook. Their preferences in the green space were different when they were alone compared to when they were with someone else.

Apart from the individual circumstances, the social connection was also identified as one of the factors that played a major influence in the priority of the green space attributes from the focus groups and interviews. It became a discriminator to the activities engaged in by the participants in the green space and, consequently, also determined the significant features for the participants. The

findings corroborate with findings by Johansson and colleagues (2011) that apart from the natural features, the restoration benefits in the green space increased by presence of social company. In another study of restoration process, the social connection was described as the presence of good friends, relatives and never unknown people in the green space (Staats, Gemerden & Hartig, 2010).

The focus group participants identified social support as the non-physical feature that was important. For example, when they used the green space to sit and relax with a friend, to listen to chatter or to watch and listen to the birds, the most important feature was the availability of seats in a quiet and semi-enclosed area, away from noisy areas such as playgrounds or games pitches. These activities are passive ones that require comparatively little physical movement. Participants who were engaged in more energetic activities were normally accompanied by other people. For example, in the focus group discussions, some participants mentioned that they regularly take their grandchildren to the playground or field to play and they thus perceived the playground to be the most desirable feature in the park. Meanwhile, for participants with dogs, either pet or guide dogs, the open field was perceived as the most desirable feature in the park because they can release the dog in the field to play.

However, findings from the CBC analysis showed that the quiet and semi-enclosed space was overall the most desirable feature in a park as opposed to the open field or playground. This suggests that features that offer a passive level of activities are perceived to be the most important feature.

Another non-physical factor that deterred the participants from using the green space independently was their perception of the public awareness of their condition. AMD sufferers felt that their presence was not recognised or acknowledged by the public because they look normal, except for those who used a white stick or guide dog. However, many of the people with AMD did not want to use any aids because of the stigma attached to being blind. This concurs with Southwell (2012) who described this behaviour as ‘passing’, i.e. trying to avoid the stigmatisation of being blind by refusing to use walking aids or a guide dog.

This finding showed that the physical and emotional state of the participants shaped their preferences for the green space. According to the literature, the

preferred attributes were specified relative to their perception (Heft, 2003). The finding concurs with explanations by Heft (2010) of the affordance that the function, meaning and attraction of the landscape properties differ across user groups.

7.2.5 Research sub-question five: How do participants' preferences for green space provide opportunities for restoration of their emotional well-being?

As described in Chapter One, it was acknowledged that people with a visual impairment tend to have a decreased quality of life because of reduced social participation, activities and outdoor mobility that eventually affect their emotional well-being. This study has therefore aimed to understand the relationship between the participants' preferences and their emotional well-being. The findings of this study can be used as evidence to broaden the restorative benefits of the green space for people with AMD.

Focus group participants were not specifically asked about the emotional state caused by their impairment because the purpose of the focus groups method was mainly to identify parameters for the CBC questionnaire. Nevertheless, participants were asked about their feelings during the follow-up interview sessions. Their emotional state caused by sight loss emerged as one of the factors that influenced their preferences. This therefore shows that AMD has affected the participants' emotional well-being. This concurs with Ribeiro et al. (2015), who also found that visual impairment is associated with reduced emotional well-being in older adults. Furthermore, AMD has the strongest relationship with depression compared to other types of visual impairment (Popescu et al., 2012). Having AMD does not only cause visual impairment; in most cases, there is also a condition known as 'Charles Bonnet Syndrome', where people who have a large degree of sight loss suffer from visual hallucinations that add to the deterioration of their emotional well-being (Macular Society, 2015). The latest study confirms the prevalence of visual hallucinations in sight loss (Gordon, 2016).

The interview findings found that the reduced levels of physical and social activity were caused by participants' lack of confidence in moving in the outdoor environment due to their visual limitations and the functional declines of recently diagnosed AMD sufferers. Lin et al. (2004) found that functional decline among the

visually impaired resulted in a decreased ability to walk and do household chores. Therefore, green space must fit the affordance of the participants by offering a compatible environment in order for them to gain confidence to move and use the green space as used to before having AMD. Participation in social activities is vital because reduced social activities are associated with reduced emotional well-being (Nyman et al., 2010). Alma et al. (2011) also suggested a similar finding, that visually impaired elderly people's participation in physical and social activity has a positive influence on their emotional well-being. Therefore, it is important to encourage people with AMD to participate in outdoor activities, and green space should be a place that encourages this participation.

There were criteria that make the green space a compatible one for the participants. Those criteria were: nearness to home, the activities offered and the natural setting of the place. Proximity was significant to the participants because AMD had led them to give up driving. Therefore, the nearest accessible green space was the neighbourhood park which they visited on a frequent basis for various reasons, mostly for relaxation and to get some fresh air. Apart from its proximity, the neighbourhood park also offers various types of activities suitable to the affordance of the participants. This interview finding was parallel with the finding from the focus groups, where activities offered in the green space were found to contribute to the compatible green space. There were passive and active pastimes that people with AMD undertake in the green space. The passive activities included slow walking and sitting on a bench while relaxing and enjoying nature. The more active pastimes included taking children to the playground, feeding the birds or fish, walking the dog or fishing in the lake. If the green space can offer these kinds of activities within a safe environment, it can be considered as being compatible for the use of people with AMD because it can encourage them to undertake physical activities. This is important to this group of people because physical activity is proven to reduce emotional distress and improve cognitive function in the elderly (Popa et al., 2009).

A combination of nearness and the physical activities being offered in the green space makes the neighbourhood park the most frequently visited green space by the participants and also helps them become familiar with it. Familiarity in turn makes them more confident to use the green space. As a result, they can experience

restoration. These findings were supported by Nilsson et al. (2011), who found that access to green space close to home encourages a restorative effect.

The interviews also found that stimulation from natural elements helps to bring relief from the feelings of distress caused by sight loss. This experience identified the natural setting of the green space as being the most desirable feature compared to man-made elements such as game pitches or playgrounds. The stimulation from the soft and cool texture of the grass, the gurgling water of the small stream and the sound of the birds chirping altered their feelings from ones of frustration to ones of calmness and contentment. This finding corroborates the concept of Russell's core affect (2003) that suggests that feeling can be altered by the stimulation provided by the natural elements. The participants' feelings were altered from the displeasure-activation dimension to the pleasure-deactivation dimension, leading to a change from feelings of distress and upset to more feelings of being calm and contented. This showed that the preference for the natural setting has an effect on the restoration of emotional well-being and is similar to that found by Herzog et al. (1997), where a natural setting has the highest overall restorative effectiveness compared to man-made and urban settings. The preference for natural settings supports to some extent the evolutionary theory of the Biophilia model that people have some innate drive to affiliate with natural things such as animals and vegetation, as cited in Bell (2012).

The interviews also found that the green space can be a medium to encourage individual motivation to undertake outdoor activities. For example, familiarity and a hazard-free footpath encouraged self-confidence among the participants to visit the park independently. These features made them less apprehensive and they could start to relax more when using the green space, which gave them more opportunity to appreciate the surrounding environment and for the experience to become more pleasurable.

The pleasantness of the experience can also be triggered by previous memories. These memories become one of the motivational factors to encourage people with AMD to use the green space after developing their visual impairment. Some of the participants mentioned that visiting places they used to visit during their childhood always brought back happy memories of family and friends. Those

memories aroused feelings of contentment. This shows that feelings can be altered by contact with the green space element they used to interact with during their childhood, such as the stream, big trees and a grassy field. Simply walking there while thinking of those memories made them feel calm and relaxed. Although this may be a temporary effect, it nevertheless helped to restore their emotional well-being by being in the green space. This finding concurs with that of Adevi and Grahn (2012) that preference for landscapes is influenced by the experience during childhood, regardless of their appearance. Ward Thompson and Aspinall (2011) also suggested that childhood experience influences visits to woodlands in adulthood.

Additionally, previous participation in nature-based activities also encouraged the participants to visit green space after developing AMD and this added to their emotional restoration. The interviews showed that participants with less experience of green space prior to having AMD were less influenced in their feelings by the features in the green space. These participants showed less interest in contact with green space. Moreover, their visual limitation tended to make them feel more apprehensive when in the green space.

Taken together, the findings show that the restorative benefit of green space can only be achieved in a compatible environment. In this research, the characteristics of the green space have to fit with the affordance of those with AMD in order that they can benefit from the restorative effect of contact with green space. The interview findings highlighted the need for a compatible environment that supports the idea of nurturing the restorative benefit in the green space as advocated by Kaplan (1995).

7.2.6 Summary – main research question: How do people with late-onset AMD use green space, and does green space play a role in promoting restoration of their emotional well-being and quality of life?

As discussed with regard to each of the research sub-questions, it was revealed that there were people with late-onset AMD who used the green space mainly for its emotionally restorative benefits rather than its physical benefits. However, the restoration process depended on various factors. The preference that led to the priority of the green space attributes was determined by the affordance of

the landscape features in green spaces that offer opportunities and constraints to this group of people based on the variables of: compatibility of the space, individual affordance and social support. A summary of all findings is given below:

Expected findings

a) Daffodils, the smell of roses, lilies, hyacinths, buddleias, scented plants such as lemon balm and the sound of gurgling water from the stream were perceived as desirable features in the park.
b) Bold and contrasting signage was the most important feature in the green space.
c) Proximity to home was important to participants who used the green space independently.
d) Women placed a higher priority on the attribute 'social'.
e) Preference for 'quiet and semi-enclosed space' was influenced by the type of activities engaged in in the green space.
f) The relative importance of green space attributes increased with the presence of social support to users.
g) Participants with dogs preferred more open fields.
h) Participants with grandchildren preferred there to be playgrounds where they could go together.
i) Playgrounds and open fields were in general the least desirable features in the green space for the sampled participants.
j) Participants with fair to moderate eyesight placed a higher priority on the sensory attribute because they do not need to be as attentive to hazards on footpaths as those with severe eyesight impairment.
k) Participants with severe sight impairment placed a higher priority on the attribute 'physical', where 'bold and contrasting signage' was the most important feature for them to obtain information about the place and plants.
l) The physical appearance of a natural setting was perceived as the most desirable feature for the park.

m) Individual physical and emotional affordances and levels of social support influenced the preferences for and relative importance of the green space attributes.
n) A neighbourhood park was the most familiar and frequently visited green space.
o) Visual and functional decline led to a lack of confidence in using green spaces.
p) Activities offered in the park encouraged participants to visit it.
q) Leisure time activities which required less physical movement were mostly preferred by those with more than one condition, e.g. poor eyesight and a mobility problem.
r) The attribute 'social' was placed as the most important followed by the attributes 'accessibility', 'physical' and 'sensory' in that order.
s) The preference for 'walking in the park' has a significant association with hearing and physical impairments in addition to AMD.
t) Uneven pavement, puddles and evidence of nuisance reduced the desirability of the park as a place to visit.

New findings

a) Features providing specific sensory stimulation were perceived as the least important compared to features providing a colour contrast.
b) The attribute 'sensory' was the least important after the attributes of social, accessibility and physical.
c) Participants who felt considerably angry placed a higher priority on the attribute 'physical'– bold and contrasting signage – because the onset of AMD made them depend on reliable information through signage to find their way around.
d) Being active in the green space was perceived as an achievement by people who liked to participate in nature-based activity before having AMD, thus, providing a greater restorative benefit than for people who did not have the same experience.

e) Perceived lack of public awareness of AMD sufferers became an impediment to the participants feeling confidence in using green space.
f) Childhood memories and previous experience of nature-based activities promoted a pleasant and enjoyable feeling for people when in the green space.
g) Proximity to home was perceived as not important at all in the focus groups and CA findings because there were other features that were more important.
h) Cyclists and dogs made people apprehensive when they were encountered on paths.

Expected findings which did not emerge

a) There would be a significant difference in the relative importance of the attribute 'accessibility' among subgroups of participants.
b) The duration of sight loss and feeling of frustration would influence the relative importance of different green space attributes.

7.3 Conclusions

There has been growing evidence provided by the literature in the past few decades on the benefits of green space to people in general. The benefits to the various aspects of human life have been demonstrated by many empirical studies (including physical, social and psychological well-being). However, there is less evidence for the restorative benefits of green space for people with disabilities, particularly with regard to late-onset visual impairment such as age-related macular degeneration (late-onset AMD). Furthermore, there is a substantial need to broaden the restorative benefits of green space to this group of people to help eliminate social exclusion and to increase their quality of life. This need is justified by the decline in the emotional well-being of people with AMD following the development of the disease later in life. Moreover, it affects a primary sense, that of vision. Loss of central vision leads to reduced outdoor mobility that can lead to a reduction in physical and social participation in outdoor activities. Less participation can result in more social

exclusion that tends to have a negative impact on emotional well-being. As a consequence, this leads to a decline in sufferers' quality of life. Therefore, to increase the quality of life of people with AMD, it is important to encourage them to remain physically and socially active in the outdoor environment and to get back to as normal a life as possible. The solution to this is to improve the opportunity for outdoor use by providing a responsive environment so they can undertake physical and social activities. To achieve this, it is therefore essential to understand how this specific group of people use green space compared to other subgroups of people with disabilities.

This research revealed how people with late-onset AMD use green space and how green space plays a role in promoting restoration of their emotional well-being. The research employed a mixed method design strategy to uncover the knowledge needed to answer to the research question. The limited evidence unearthed through the literature search led to the selection of the mixed method approach as the best option for combining quantitative and qualitative research to support each other during their interpretation using triangulation.

The general findings are that the use of green space by AMD sufferers is mainly influenced by two factors. Firstly, the individual affordance perceived by the participants as a result of their physical and emotional state. Secondly, their social connections to humans and/or animals. Both factors became discriminators for their preferences and perceptions of the features of green space that led to the prioritisation of green space attributes as measured by their relative importance. The individual affordances and the presence of social company led to participants perceiving affordances in the landscape differently from one another. They perceived some of the features as motivating and others as discouraging their use of green space.

AMD makes seeing details and reading difficult for sufferers. Adding to this difficulty, many of them also have a physical impairment associated with ageing, because late-onset AMD tend to occurs in older age. Furthermore, many participants reported considerable feelings of frustration and anger towards their sight impairment. Therefore, the combination of their impairment and the feelings it engendered affected how participants use green space according to their affordances.

The research finds that certain features such as footpath condition and shared footpath with cyclist are capable of stimulating feelings of apprehension if not suited to their affordance. This may lead to greater distress and anxiety. On the other hand, the research also finds that social connection has the significant potential to eliminate risk and FOF. Therefore, it is suggested that having social company, although not in compatible green space, can reduce distress. This shows that green space attributes can alter a person's feeling into two dimensions of pleasure-displeasure or activation-deactivation, as illustrated by Russell (2003). For example, hearing the soothing sound of water in a stream may alter someone's feeling to one of contentment, serenity or feeling placid or calm, while sharing a footpath with cyclists may generate feelings of tension and distress. This finding also supports ART by Kaplan (1995), in that having contact with certain attributes in green space can restore emotional well-being in people with AMD. The research finds that the social connection, as represented by social support from friends or family members and animal companions such as a pet dog or a guide dog, also influenced the amount and type of use of green space by the participants. It determined the activities that they engaged in in the green space and also their preferences for those features that supported those activities. Social connection is also found to be a motivator for people with AMD to venture into an unfamiliar outdoor environment. However, they are simultaneously exposed to risk. In this case, the fear of risk may become a major barrier to them engaging in physical activities in green space. However, as these findings came from the qualitative part of the research, any generalisation should be treated with caution. Nonetheless, the findings support the result of the CBC analysis in providing an explanation of each priority as set by the survey subgroups.

From the perspective of the quantitative findings, the research finds that the relative importance of green space attributes differed by gender, the degree of sight loss and the emotional state of the participants. Although it was expected that the duration of sight loss and physical impairment might influence the relative importance, in this study, there was no significant difference found in the analysis of variance. This suggests that the participants with a variable period of sight loss and physical impairment have the same priority for green space attributes.

The research also shows that the ‘social’ attribute became the main priority leading to the relative importance of green space attributes followed by ‘accessibility’, ‘physical’ and ‘sensory’. Women placed a higher priority on the ‘social’ attribute and the discriminator for this priority was the type of activities they engaged in in the green space. These activities were influenced by the affordance of the participants and their social connection. They perceived that ‘quiet and semi-enclosed space’ offers an opportunity to sit and relax while enjoying nature, or to sit with a companion and listen to chatter.

Apart from gender difference, the relative importance of the attribute ‘physical’ differed by the degree of sight loss and the feeling caused by the sight loss. The research explains the association between these priorities via a thorough examination of all of the findings from each method using the triangulation strategy. It shows that a higher priority was placed on the attribute ‘physical’ because the people with AMD were highly dependent on ‘bold and contrasting signage’ to obtain the information they needed in the green space. Similar priority was found in participants with a considerable feeling of anger caused by sight loss. However, further research is needed to obtain a more reliable explanation for these associations. One possible explanation may be the need for information about the surrounding place.

The research demonstrated that participating in physical and social activities in a green space can have a restorative effect on people with AMD, provided that such a space is compatible with their affordance. It was found that compatible green space provides spaces for participants to use the green space confidently with or without social support. Therefore, they could use it independently because many of them lived alone.

The research also finds that social support and previous participation in nature-based activities, including childhood experiences, were found to expedite the restorative benefit of contact with natural elements in a green space. Taken together, the emotional restoration could be experienced when the participants have contact with certain features they perceived as important according to the value attached to them. Therefore, the green space played a mediating role in encouraging the

motivation to participate in outdoor activities. Green space can therefore contribute to a promotion of the restorative benefits to people with AMD.

Apart from the motivational factors, there were also two factors that were identified as a deterrent to the use of green space by some of the participants. One was a result of the self-perception of the participants themselves due to their visual condition. Their perception of low public awareness of their condition was found to be a disincentive for them to use green space. Another factor, the combination of their visual impairment, such as AMD, with a hearing or mobility problem, caused feelings of apprehension when sharing footpaths with other users. These deterrents can nevertheless be overcome with sufficient social support to increase confidence in using the green space. In terms of design, the provision of separate foot and cycle paths may also help.

The significance of proximity to home was found to be perceived differently from the results across the research methods. From the focus groups and CBC analysis, nearness to home was not as significant as other features. However, in the follow-up interviews, it was found that proximity was significant to the participants because they no longer drive. Moreover, using public transport may not be easy for many of them either. An easily accessible neighbourhood park is important because it can be the most familiar and frequently visited green space by the participants and once they get to know it well, are more confident using it.

These findings show the potential of a mixed method design for researching the use of green space by people with late-onset AMD. The scoping process using focus groups not only generated parameters for the CBC questionnaire, but also yielded an abundance of other data that could be used in the triangulation to support other findings. The CBC analysis provided another angle of assessment in the relative importance of the green space attributes from among all the significant features identified in the focus groups. The follow-up interviews were conducted to gain an in-depth understanding of the factors influencing the preference and the relative importance of the attributes obtained in the conjoint survey. This method also explained how the green space played a role in encouraging participation and facilitating a restorative effect for the participants.

The CBC survey proved to be a robust tool to assess the relative priorities. Compared to a conventional questionnaire design, conjoint presented alternatives in combination, therefore only the most significant features were valued by the participants while the least significant were traded off. Hence, the results identified the most important features specific to the target group.

The walk-along interview method proved to be a good approach for obtaining an in-depth understanding of how participants use green space. However, due to ethical considerations and the health conditions of some of the participants, home interviews were conducted at their request as an alternative and there were limitations to these. Although each method was employed independently, they were designed to strengthen each finding using triangulation during the interpretation stage.

Taking all the findings into consideration, the contributions of this research can be divided into two fields; landscape architecture and rehabilitation and support services. The research contributes to the field of landscape architecture by:

- Communicating existing knowledge of the benefits of green space to people with different needs;
- Highlighting the importance of having a compatible space that can encourage restorative benefits for people with visual impairment;
- Including the specific design requirement that fits the use of people with AMD;
- Recognising how green space design can positively or negatively affect users with AMD;
- Identifying those sensory design features, such as the sound from a stream and the fragrant smell of flowers, which are appreciated by people with AMD;
- Ensuring the provision of bold and contrasting signage and the proper marking of steps and footpath edges;
- Promoting neighbourhood parks as the most appropriate green spaces for people with AMD;
- Ensuring that the main activities preferred by people with AMD, such as relaxation, are incorporated into the design;

- Demonstrating that the sharing of spaces and footpaths with other users is a problem for visually impaired people, especially when this is combined with another impairment;
- Reinforcing the presence of natural elements in order to maximise the restorative benefits.

The research also contributes to the field of rehabilitation and support service by:

- Identifying that having contact with green space can encourage physical and social participation;
- Communicating to sufferers, their families and support services the restorative benefits of green space on the emotional well-being of the elderly with a visual impairment;
- Emphasising the importance of social support in helping to build self-confidence to use the green space for restorative benefits;
- Recognising that older people with a visual impairment may have a negative perception about the public acceptance of their condition that may deter them from using the green space, thereby affecting the restoration process;
- Showing how green space can be a part of a rehabilitation programme through the stimulation of natural elements to alter the feelings of people with AMD;
- Building on the benefits derived from previous participation in nature-based activities and childhood experiences in order to expedite the restorative benefits.

Finally, the provision of green space must be based on an understanding of the relative importance of the attributes of that green space set by AMD sufferers according to their affordances in green space and how the spaces meet their needs as a group. Provision of a sensory garden is often prevalent in the current discourse related to visual impairment. However, this research has shown that this may not apply to people with late-onset AMD.

The research has shown that AMD sufferers can still use an existing park provided that certain features are designed according to meet their needs. This is not

especially difficult to do and it is understood that this finding adds to the design guidance available about people with different forms of AMD.

7.4 Policy and design implications

An understanding of the relative importance of green space attributes as set by people with late-onset AMD has identified specific areas that should be emphasised in the provision of green space to fit their needs. It is suggested that there is no need to provide a sensory garden for this group of people because of the way they use green space. There is therefore no significant pressure on park management's budgets as implementation of the relevant recommendations can easily be achieved in any green space. Additionally, the design implications are inclusive for all users as nothing particularly special is needed. The interweaving factors as presented in the findings may also benefit a strategy of increased support service in addressing the emotional well-being issues surrounding visual impairment and AMD.

Although the research has identified that the individual affordances and social connection were the most influential factors in shaping the use of green space by people with AMD, there were three design features from the perspective of landscape design that should be emphasised for any green space provision, either when upgrading an existing park or constructing a new one. These are the features identified as having the potential to increase independent use of the green space regardless of any social support its users may have. The provision of these features is considered to help create the ideal structure for green space that fits the needs of people with AMD. The three aspects are as follows:

7.4.1 Natural elements

A natural setting was perceived to be the most desirable feature of a green space. Places such as woodlands and rural areas were mentioned by the study participants as their favourite places to visit before they suffered from AMD. These types of places were also perceived to be ideal places to walk in or to visit following

the onset of AMD. However, the aesthetic pleasure was limited and AMD sufferers, to varying degrees, were no longer able to see the green space clearly. As a result, their appreciation of the place and its features was gained more through stimulation of the proximal senses. Hence, it is very important for the landscape architect to continue to emphasise these elements when planning a green space so that people with AMD can continue to use it and appreciate its natural features as they used to do prior to losing their sight.

The presence of natural elements stimulates the senses to yield a sense of appreciation and enjoyment when in contact with them. It was one of the ways to motivate this group of people to use green space. Regardless of the type of green space, natural elements such as grassy fields and water features that produce a soothing sound are essential. Birds and a pond with fish are also desirable.

7.4.2 Safety

This research has found that safety was perceived to be an important feature by people with AMD. This was primarily the result of their visual limitation, which requires them to be extra attentive, particularly when using the footpaths in a park. This requirement for constant attention can lead to fatigue and frustration when in an outdoor environment, especially in unfamiliar settings. Therefore, knowing that safety has been considered as a factor can motivate people with limited vision to use green space even after sight loss.

The most important feature was the state of footpaths. These should be well maintained to avoid any hazards such as stones and twigs, tree roots, potholes, puddles and uneven surfaces. The demarcation of footpath edges with bright and contrasting colours is also essential to help AMD sufferers to successfully navigate their way around. Demarcation of steps is also important to enhance safety when dealing with a change in level. People with a severe sight impairment face the problem of being unable to detect changes in the level of the footpath, especially when there is a step. Steps that are clearly marked with contrasting paint or other material can help people use their walking sticks to judge the depth of the steps. This makes it safer for them to walk along the footpath unaided.

Another safety aspect that can promote accessibility is the availability of information on signage in bold and contrasting colours. A high degree of contrast is needed to ensure readability. Therefore, appropriate signage helps AMD sufferers to find their way around as well as obtain other information such as opening times, emergency contacts and details of the trees and plants in the park.

7.4.3 Space division

Although the findings suggest that there was no need for a specific sensory garden for people with AMD, there must nevertheless be some particular space provided to accommodate their needs. Some separate space is needed to encourage self-confidence since the study participants preferred quiet and enclosed spaces, which they perceived as area capable of offering more passive activities, calmness and a sense of relaxation. This type of space suited their physical and emotional affordances.

Furthermore, sharing the space with other users such as cyclists and dogs tended to cause them to feel intimidated. They seemed to feel apprehensive and unsafe because the sudden appearance of a cyclist or dog may startle and unbalance them, potentially leading to them falling, or to the fear of falling. Therefore, some kind of separation between cycling and walking is a good idea.

Space division according to different types of activities can also help AMD sufferers to use the green space with confidence. For example, separation between an open field that is normally used for games or a place to let dogs run and a semi-quiet area for sitting and enjoying nature seems an ideal solution.

7.5 Revisiting the research process

The mixed method research approach offered a two-fold investigation to understand the use of green space by people with late-onset AMD. The sample population was selected because the disease is the leading cause of sight loss among the elderly in the UK and, to date, no cure has been found.

Loss of vision can have a devastating impact on sufferers. Most struggle to cope with the impairment and suffer a decrease in their emotional well-being. The

sudden change in their life leads to a reduction in social contact and limited outdoor mobility. Therefore, a sensitive method of investigating this group of people was needed. Ethically, these people were considered vulnerable or people deemed vulnerable group (PVG), as classified by the Edinburgh University Ethical Committee, which made this research an arduous piece of work during the data gathering process.

Having CA as the quantitative method to assess the relative importance yielded precise and credible information about the priorities set by this group, even though the sample was relatively small. Nevertheless, it was sufficient to obtain valid data for the purpose of this thesis. The CBC analysis offered a robust method to obtain quality information that will inform landscape designers and policymakers about optimum design solutions for people with AMD.

The parameters of the questionnaire were set using the information gathered in the focus groups. This preliminary data gathering process was very important to ensure that the questions set in the CBC questionnaire were within the range of participants' affordances. The priorities set by the respondents through the CBC were the result of the trade-off exercise, where the most important features were examined using the combination of all alternatives rather than individual options.

The data collection procedure was tailored to the conditions of the participants based on the feedback they gave. Nevertheless, they required close assistance in order to ensure that the answers they provided to the questionnaire were useful. This was because a majority of the participants could not read well even with visual aids or large print. Teamwork between several facilitators is highly recommended to make sure all participants obtain face-to-face help in answering the questionnaire.

The level of participants' understanding of the questions was considered good because the conjoint questionnaire was presented through short and simple descriptions that could be mentally visualised. Assessment using pictorial questions was not suitable because of the participants' visual limitations. A combination of CA and interview methods proved a good way to understand the use and restorative benefits of green space for the study. However, many of the participants could not move outside for long periods due to their physical condition. As a result, some of

the interviews were conducted at the participants' homes, which was not ideal. Nevertheless, the data gained from the interview methods, either the walk-along or home interviews, were sufficient to provide an in-depth insight into the preferences set by the participants and to explain the restorative effect of having contact with green space. The walk-along interview was highly suitable as it enabled participants to directly engage with the subject matter of the interviews in the real environment. This approach made the interviews flow naturally and required less effort on the part of the researcher to obtain participants' insight.

Taking all of the findings together, the mixed methods model in this research has proven to be a robust and well-coordinated solution for conducting research that deals with participants with special needs, in this case the elderly with central vision loss caused by late-onset AMD.

7.6 Limitations

This research faced major challenges in recruiting participants. There were various problems including the lengthy negotiating process, the small number of participants attending support meetings, the limited number of participants capable of engaging in the walk-along interviews and the arduous data gathering procedure as a result of participants' limited vision. Therefore, having many people working together in a team is better than working alone. There was no clinical intervention in measuring the level of visual acuity and visual field to determine the current condition of the participants' sight loss because the purpose of this research was merely to focus on the social impact of the visual impairment by having contact with green space. Therefore, the level of the participants' eyesight condition was self-reported based on the description given, which represents the degree of the visual condition. It was not known whether one eye or both eyes were affected. As a result, there is a possibility that participants may have had different preferences for the green space. The notion of this cross-sectional study limits the inference of causality between the emotional state and the individual priorities. Moreover, the self-reported feelings and visual condition may imply a social desirability bias.

A more rigorous statistical analysis could be performed with an increased number of participants in the sample. In addition, most of the data are skewed so that

a non-parametric statistical test was used as the analytical method. However, the data gathered were valid for the analytical method using the CA software, based on the objectives of this research.

The walk-along interview method was conducted with much care because the participants were deemed vulnerable and this must be ethically considered. The interview process was conducted in a very limited time, during late spring and summer, because the participants were not willing to walk in the outdoor environment when the weather was cold. This explains the small number of participants in the walk-along interviews. However, the interpretation of the findings was validated through a triangulation strategy across the methods to build stronger empirical evidence.

7.7 Areas of future research

Although the findings have answered the research questions, more research directions have developed that are worthy of further investigation. As CA is a promising method for studying the preferences of people with AMD, it offers a good opportunity for researching groups of people with other types of visual impairment for comparison with the findings of this particular research. This information is important to understand the different priorities of groups of blind or partially sighted people with different visual conditions in green space. The suggested areas for further research are:

- The same methodological research strategy could be used to research the differing needs of people with other disabilities;
- A comparison study could be performed using the same research model to investigate the differences in the preferences set by people with a visual impairment from different geographical contexts, climates and cultures;
- This research investigated people with AMD, which mostly affects older people and the results show that the attribute ‘social’ was their main priority in terms of decision-making regarding a desirable park. Therefore, this raises the question of what priorities might be set by visually impaired people from different age categories;

- This thesis contains an exploratory analysis section incorporating a correlation and answer tree. The findings from this analysis show some relationship between preference and certain variables that are worthy of further investigation;
- An examination of the mediating effect of physical impairment on preferences for green space features is suggested.

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Appendices

Appendix 1

Snellen chart

Distance in feet what you can see

20
—
40

Distance in feet what normal people can see

The larger the second number is the worst your sight is.

Appendix 2

Project Description

Title of project:
Study of preferences in green space attributes and its implication for health and wellbeing

Researcher:
Azlina Aziz

Institute:
Edinburgh School of Architecture and Landscape Architecture (ESALA), College of Art, University of Edinburgh

Study field:
Landscape Architecture (Ph.D.)

Abstract:
Having sight impairment should not limit one's opportunity to be socially included and attain the extensive benefits by being in the green space. Therefore, it is, relatively, a challenge for the landscape designer to ensure every attribute of the green space is sensibly planned and designed accordingly, to deliver the impact and benefits, even to visually impaired people. However, to date, little research has explored the comparative importance of the green space environmental attributes for visually impaired people and how these attributes promote their sense of emotional wellbeing. This study will draw on a sample of visually impaired people with central vision loss across Scotland, ranging from the partially sighted to severely sight impaired, or blind, to address the research gap. It will employ the mixed method sequential approach, starting with a focus group for identifying the green space attributes that matter to visually impaired people, as a basis for developing the choice-based questionnaire. For the follow-up method, the walk-along interview will be used to gain an in-depth understanding of how these attributes could affect their emotional response and activities in the green space. The expected results will demonstrate the different priorities between the subgroup of visually impaired people, based on the different variables, such as the duration of the sight loss and severity of the sight impairment. The value of this research lies in identifying the landscape design attributes that are of great importance to visually impaired people, and such a finding can be of considerable value to policy makers and landscape designers. It may also prove valuable as a new rehabilitation approach in tackling the emotional issues surrounding visual impairment.

Methods:
Focus group, survey and interview.

Ethics:
This study has been reviewed and approved by the Ethical Committee of University of Edinburgh on 10th July 2013.

What needed from the gatekeeper:
1. To contact and inform the potential participants
2. To provide the space for group discussion

Appendix 3

Meeting Agenda

1. Introduction

    - The researcher:
      Name: Azlina Aziz
      Institution: University of Edinburgh
      Study: PhD in Landscape Architecture
    - The study is about the preferences of the park attributes from the perspective of the people with AMD

2. Purpose of this session

    - To discuss about your experience in the local park

3. Filling up the Consent form
4. Session begins:

    - Write down name, age, duration of sight loss in the index card
    - Questions:
        1. How frequent you visit the park in your area?
        2. What did you do there?
        3. What are the most appealing features of the park?
        4. What are the less appealing features?
        5. Generally, how do you feel about the impairment?

5. Wrap up of the session
6. Invitation form to participate in the choice-based survey
7. Closing

Appendix 4

Information Sheet: Group discussion

The study of preferences in green space feature

We would like to invite you to participate in a PhD research study exploring the preferences of green space feature and its effects on health and emotional wellbeing.

What is the aim of the project?

The purpose of this study is to identify the most preferred green space features and its implication on emotional wellbeing through group discussion.

Why is the project important?

This research aims to identify the green space features that important to you to increase understanding and promote awareness of the health benefits of being in the green space.

If I choose to participate, what will I have to do?

Complete the consent form and return it to the researcher.
The researcher would like to hear from you about your experience visiting the park and what you think of that park, for example, what is the most appealing feature in that park and why. We would like to record what is said, if possible, as a reminder of the dialogue but would keep everything anonymous as detailed below. All audio file will be deleted after transcription.

How will the information that is collected be used?

All information provided will be kept entirely confidential. The collected information will be evaluated and used for publication and to make recommendations to the landscape designers and policy makers, but your name will not be used in any reports. We would be very happy to present our findings to you once the information has been evaluated.
Please contact the researcher if you have any inquiries:

Azlina Aziz
Edinburgh School of Architecture
and Landscape Architecture (ESALA)
B.10, 5 Forrest Hill,
Edinburgh, EH1 2QL
Tel: 07831741633
Email: azlina.aziz@ed.ac.uk

Appendix 5

Consent Form

Title of Project:
Study of preferences in green space attributes and its implication on health and wellbeing

Name of researcher:
Azlina Aziz

1. I confirm that I have read and understand the information sheet dated September 2013 for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason without my medical care or legal rights being affected.
3. I am happy to be participated in the discussion and for the discussion to be recorded.
4. I understand that no time will my identity be disclosed or in any subsequent professional publications of the results of this study.
5. I agree to take part in the above study.

Name of participant	Signature and Date
Azlina Aziz	Signature and Date

Appendix 6

Sample size calculation for choice-based conjoint (CBC)

Formula:

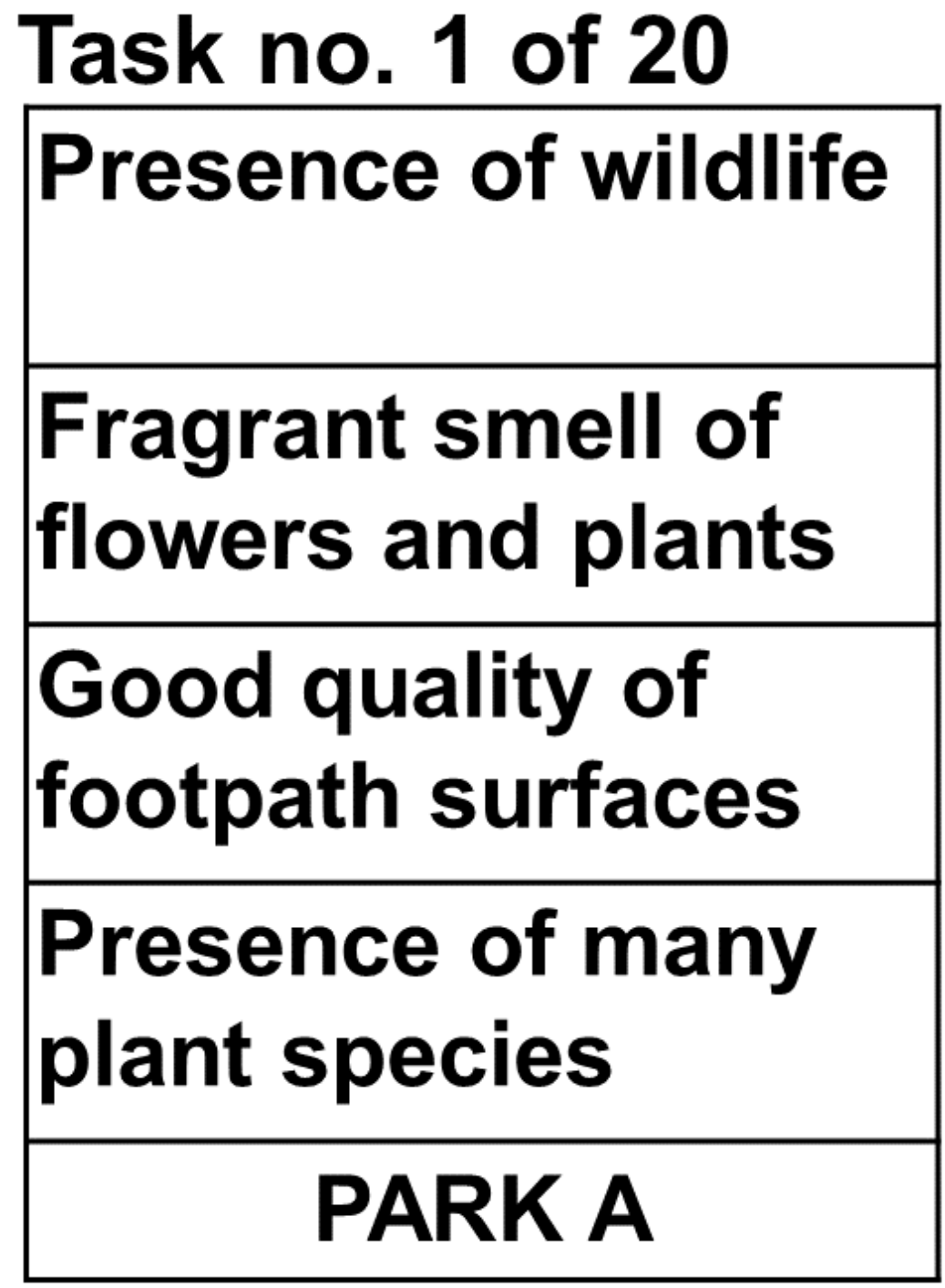
$$\frac{nta}{c} = 500$$

where:

n = number of respondents;
t = number of tasks;
a = number of concepts per task not including 'none' option;
c = largest number of levels for any one attribute;

and, 500 is the minimum threshold.

Sample of the font size 40 for the questionnaire



Appendix 8

Interview checklist (estimate duration: 60 minutes)

The demographic background:

- Age
- Gender
- Sight condition
- Duration of sight loss
- Feeling towards sight loss
- Other difficulties
- Living arrangement

Questions (to be asked randomly)

1. The frequency of visits (before and after sight loss).
2. Reason for the visit.
3. What make you feel like visiting this place? Why?
4. Any particular spot/feature that you prefer most? Why?
5. How do you feel by being there? Why?
6. The activity you do there (before and after sight loss).
7. Any particular thing you don't like about the place? Why?
8. What is your future expectation about this place? Any aspect needs improvement?

Appendix 9

Research Ethics Checklist: Levels Two and Three

This code applies to all research carried out in the CHSS, whether by staff or students. The checklist should be completed by the Principal Investigator, leader of the research group, or supervisor of the student (s) involved. Those completing the checklist should ensure, wherever possible, that appropriate training and induction in research skills and ethics has been given to researchers involved prior to completion of the checklist, including reading the College's Code of Research Ethics.

This is particularly important in the case of student research projects.

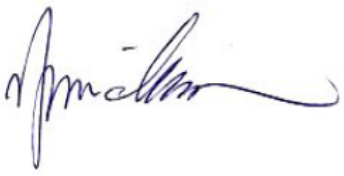
If the answer to any of the questions below is 'yes,' please give details of how this issue is being/will be addressed to ensure that ethical standards are maintained.

1 THE RESEARCHERS	
Your name and position	**Azlina Aziz** **PhD research student in Landscape Architecture**
Proposed title of research	**Visually impaired people and the green space**
Funding body	**None**
Time scale for research	**3 years**
List of those who will be involved in conducting the research, including names and positions (e.g. 'PhD student')	**Dr. Simon Bell (Supervisor)** **Lisa Mackenzie (Supervisor)**
2 RISKS TO, AND SAFETY OF, RESEARCHERS	
Those names above need appropriate training to enable them to conduct the proposed research safely and in accordance with the ethical principles set out by the College	**No**
Researchers are likely to be sent or go to any areas where there safety may be compromised	**No**
Could researchers have any conflicts of interest?	**No**
3 RISKS TO, AND SAFETY OF, PARTICIPANTS	
Could the research induce any psychological stress or discomfort?	**No but I will make every effort to ensure that participants feel comfortable and secure like providing transport or paying expenses and ensuring refreshment are available.**
Does the research involve any physically invasive or potentially harmful procedures?	**No.**

Could this research adversely affect participants in any other way?	**No.**
4 DATA PROTECTION	
Will any part of the research involve audio, film or video recording of individuals?	**Within the research sessions, there will be the opportunity to use tape recorders if the participants give their consent. I will explain that the information will be listened to and transcribed by myself and I will not use their real names. I will ask permission to use their words. I will explain that anything they say that they later choose to retract I will not include in my data collection.** **No filming and video recording will be used.**
Will the research require collection of personal information from any persons without their direct consent?	**No.**
How will the confidentiality of data, including the identity of participants (whether specifically recruited for the research or not) be ensured?	**All participants name will be made anonymous or the participants will be given the opportunity to choose a pseudonym that will be known by me and the participant only and will be used in any subsequent reports if needed.**
Who will be entitled to have access to the raw data?	**I will as the principal researcher and this will be shared through the analytical process with my supervisors.**
How and where will the data be stored, in what format, and for how long?	**The data will be kept in the university network hard drive with password protected until the completion of the study.**
What steps have been taken to ensure that only entitled persons will have access to the data?	**It will be a password protected data and only the principal researcher has that password.**
How will the data be disposed of?	**The data will be destroyed at the end of the study in accordance with the Data Protection act 1998 by using the university's confidential waste disposal service upon request.**
How will the results of the research be used?	**The results of this research will be used in my thesis writing, academic publication and conference.**
What feedback of findings will be given to participants?	**A short summary of the result will be given to the participant upon request.**

Is any information likely to be passed on to external companies or organisations in the course of the research?	**The most likely I could anticipate here is the result of the study might be in the interest of the Royal National of Blind Institute (RNIB), if any.**
Will the project involve the transfer of personal data to countries outside the European Economic area?	**No.**
5 RESEARCH DESIGN	
The research involves living human subjects specifically recruited for this research project *If 'no' go to section 6*	**Yes. The participant will be recruited on voluntary basis. The invitation will be made through their group/association with information leaflet and informed consent form. Basically this research will be conducted in three consecutive sessions which are focus group; survey and lastly, the one to one go along interview in the green space.**
How many participants will be involved in the study?	**For the focus group method: 2-3 focus groups (up to 5 participants in one group)** **For the survey method: up to 100 participants.** **For one to one go along method: up to 10 participants.**
What criteria will be used in deciding on inclusion/exclusion of participants?	**Only people with central vision loss with various degree of severity and had that impairment in later life will be invited to participate. None of the participant is deaf or having more than one disability.**
How will the sample be recruited?	**The invitation for participation will be sent through the support group and any blind association across Scotland and the appointment will be made to meet the groups. There will be a briefing session together with the circulation of the information leaflet and informed consent form to be filled by the participants on voluntary basis.**
Will the study involve groups or individuals who are in custody or care, such as students at school, self-help groups, and residents of nursing home?	**No**
Will there be a control group?	**No**

What information will be provided to participants prior to their consent? (e.g. information leaflet, briefing session)	**This research will be based on the freely given, informed consent of those participating. This involves providing a full explanation of the research project, including information about: the purpose of the research, why it is being undertaken, what is expected of participants in terms of time and activities, how information will be gathered and recorded, what will happen to the information provided, and how the findings will be disseminated.**
Participants have a right to withdraw from the study at any time. Please tick to confirm that participants will be advised of their rights	**I will provide explanations in terms and language which are accessible and meaningful to participants about their rights to withdraw from the study in the information sheet.**
Will it be necessary for participants to take part in the study without their knowledge and consent? (e.g. covert observation of people in non-public places)	**No**
Where consent is obtained, what steps will be taken to ensure that a written record is maintained?	**It will be kept in a proper filing system in my study room.**
In the case of participants whose first language is not English, what arrangements are being made to ensure informed consent?	**It is been identified at this stage of the study that all participants are Scotland residents. If any case there is participant that could not understand English, I will seek for the translation service to the specific language needed.**
Will participants receive any financial or other benefit from their participation?	**Yes. It is the recognition of the valuable role that the participants have played in offering their time and effort for the study in the form of a voucher for a store, for instance.**
Are any of the participants likely to be particularly vulnerable, such as elderly or disabled people, adults with incapacity, your own students, members of ethnic minorities, or in a professional or client relationship with the researcher?	**Yes. My entire participant will be visually impaired people with various degree of severity and some of them are elderly. I will strictly make sure that only participant with good health condition will be selected for one to one go along interview and it will be stated in the consent form for that particular session. The one to one go along interview will take place at the space chosen by the participant to reduce any intimidating feeling. The familiarity of the space could help to eliminate any**

	kind of that feeling.
Will any of the participants be under 16 years of age?	**No**
Do the researchers named above need to be cleared through the Disclosure/Enhanced Disclosure procedures?	**No**
Will any of the participants be interviewed in situations which will compromise their ability to give informed consent, such as in prison, residential care, or the care of the local authority	**No**
6 EXTERNAL PROFESSIONAL BODIES	
Is the research proposal subject to scrutiny by any external body concerned with ethical approval?	**No**
If so, which body?	
Date approval sought	
Outcome, if known *or*	
Date outcome expected	
7 ISSUES ARISING FROM THE PROPOSAL	
In my view, ethical issues have been satisfactorily addressed, OR In my view, the ethical issues listed below arise and the following steps are being taken to address them:  Signature: Date: 18 June 2013	

8 Ethical consideration by School

The following section should be completed by the Head of School once the proposal has been considered by the School's research group.

I can confirm that the proposal detailed above has received ethical approval from the School [* subject to approval by the external body named in section 6]

Signature: Date: 10th July 2013